Visibility analyses, using a GIS, resulted in a finding of no visibility with regard to the Grand Mesa Scenic and Historic Byway to the north beyond the valley floor near Cedaredge, or with regard to the West Elk Loop Scenic Byway.

Earthwork for the access roads and pads would create cut-and-fill slopes, where the soil would be exposed until vegetation is re-established. These slopes likely would be evident from the earth color of the exposed base soil (until vegetation is established) and lighting (since any overhead tree canopy, that could provide shade and help obscure the slopes, would be eliminated). This would be the case until grasses and forbs can become established.

Although well pad earthwork would have limited visibility from the access roads and nearby USFS roads, the completion rig, exhaust vent, and production structures would be more visible (during applicable times of operation). Project elements would be partially obscured by landforms, while intervening trees (e.g., between USFS roads and well pad) would screen views during late spring, summer, and early fall periods. As a result, project elements are expected to be partially hidden by trees and other vegetation. The completion rig and exhaust vent would create strong vertical lines in the immediate foreground. The mature aspen trees would filter or obscure the forms, lines and colors of portions of taller structures. Night-time glow from night lights and flares would be visible by recreationists and users of USFS roads within the viewsheds.

With implementation of project design features, including implementation of the SWPPP, Grading and Surface Hydrology Plan, and reclamation program, proposed activities should meet the VRM Class III and Modification objectives of these areas.

Site-specific Impacts

The following visual impacts are specific to particular well sites or their associated new road spurs.

Leon Lake #4. The earthwork for the pad would create minimal cut and fill slopes in flat to moderately sloping topography. Impacts to visual receptors would be diminished substantially when vegetation is re-established. The mature aspen in the immediate foreground and foreground would aid topographic screening within the viewshed during summer months. The proposed access road would be screened in the immediate foreground and foreground by immature aspen vegetation and moderate to steeply sloping topography. The majority of visibility acreage occurs in the middle ground and background viewing situations. Overall, visibility of the proposed ground surface would cover approximately 16,215 acres or 3.6 percent of the total viewshed. Overall, visibility of the tallest structure would cover approximately 22,147 acres or 4.9 percent of the total viewshed.

Leon Lake #5. The earthwork for the pad would create minimal cut and fill slopes in flat to moderately sloping topography. Impacts to visual receptors would be diminished substantially when vegetation is re-established. The mature aspen in the immediate foreground and foreground would aid topographic screening within the viewshed during summer months. The proposed access road would be screened in the immediate foreground and foreground by mature and immature aspen vegetation and moderate to steeply sloping topography. The majority of visibility acreage occurs in the middle ground and background viewing situations. Overall, visibility of the proposed ground surface would cover approximately 16,215 acres or

3.6 percent of the total viewshed. Overall, visibility of the tallest structure would cover approximately 22,147 acres or 4.9 percent of the total viewshed.

The proposed location of the well pad would be approximately 330 feet from the centerline of FR 127, which is an exception to the lease stipulation of drill sites being at least 500 feet from road centerlines. The effects of the proposed pad location on visual resources would be temporary. Although the pad would be located within the stipulated road buffer, mature aspen growth on the east side and young aspen on the south side of the pad would at least partially screen views of the well site from FR 127. The drilling and completion rigs would be visible from FR 127 for the 2-week timeframe for these activities. The flare stack would be visible during testing (possibly for 1 to 3 years). However, even if the pad was located 500 feet from FR 127, the rigs and flare stack still would be visible.

Bull Park. The earthwork for the pad would create minimal cut and fill slopes in flat to moderately sloping topography. Impacts to visual receptors would be diminished substantially when vegetation is re-established. The mature aspen in the immediate foreground and foreground would aid topographic screening within the viewshed during summer months. The proposed access road would be screened in the immediate foreground and foreground by immature aspen vegetation and moderate to steeply sloping topography. The majority of visibility acreage occurs in the middle ground and background viewing situations. Overall, visibility of the proposed ground surface would cover approximately 16,215 acres or 3.6 percent of the total viewshed. Overall, visibility of the tallest structure would cover approximately 22,147 acres or 4.9 percent of the total viewshed.

Powerline. The earthwork for the pad would create minimal cut and fill slopes in flat to moderately sloping topography. Impacts to visual receptors would be diminished substantially when vegetation is re-established. The mature aspen in the immediate foreground and foreground would aid topographic screening within the viewshed during summer months. The proposed access road would be screened in the immediate foreground and foreground by mature aspen vegetation and moderate topography. The majority of visibility acreage occurs in the middle ground and background viewing situations. Overall, visibility of the proposed ground surface would cover approximately 19,459 acres or 4.3 percent of the total viewshed. Overall, visibility of the tallest structure would cover approximately 31,114 acres or 6.9 percent of the total viewshed.

Hubbard Creek. The earthwork for the pad would create visible cut and fill slopes in moderate to steeply sloping topography. Impacts to visual receptors would be diminished when vegetation is re-established. The mature aspen in the immediate foreground and foreground would aid topographic screening within the viewshed during summer months. The proposed access road would be screened in the immediate foreground and foreground by mature aspen vegetation and moderate to steeply sloping topography. The majority of visibility acreage occurs in the middle ground and background viewing situations. Overall, visibility of the proposed ground surface would cover approximately 12,303 acres or 2.7 percent of the total viewshed. Overall, visibility of the tallest structure would cover approximately 16,335 acres or 3.6 percent of the total viewshed.

Oakbrush. The earthwork for the pad would create minimal cut and fill slopes in flat to moderately sloping topography. Impacts to visual receptors would be diminished substantially when vegetation is

re-established. The low-growing oakbrush and meadow vegetation in the immediate foreground and foreground would leave exposed project elements within the viewshed. The proposed access road would be visible in the immediate foreground and foreground. The majority of visibility acreage occurs in the middle ground and background viewing situations. Overall, visibility of the proposed ground surface would cover approximately 15,942 acres or 3.5 percent of the total viewshed. Overall, visibility of the tallest structure would cover approximately 20,569 acres or 4.5 percent of the total viewshed.

Hawksnest. The earthwork for the pad would create minimal cut and fill slopes in flat to moderately sloping topography. Impacts to visual receptors would be diminished substantially when vegetation is re-established. The low growing oakbrush and meadow vegetation in the immediate foreground and foreground would leave exposed project elements within the viewshed. The proposed access road would be visible in the immediate foreground and foreground except in those areas screened by the oakbrush vegetation. The majority of visibility acreage occurs in the middle ground and background viewing situations. Overall, visibility of the proposed ground surface would cover approximately 9,816 acres or 2.1 percent of the total viewshed. Overall, visibility of the tallest structure would cover approximately 18,082 acres or 4.0 percent of the total viewshed.

Thompson Creek. The earthwork for the pad would create visible cut and fill slopes in moderate to steeply sloping topography. Impacts to visual receptors would be diminished when vegetation is re-established. The mature aspen in the immediate foreground and foreground would aid topographic screening within the viewshed during summer months. The proposed access road would be screened in the immediate foreground and foreground by mature aspen vegetation and moderate to steeply sloping topography. The majority of visibility acreage occurs in the middle ground and background viewing situations. Overall, visibility of the proposed ground surface would cover approximately 7,562 acres or 1.6 percent of the total viewshed. Overall, visibility of the tallest structure would cover approximately 16,654 acres or 3.7 percent of the total viewshed.

3.10.2.2 No Action

The scenic integrity of the GMUG NFS lands would not change. For BLM lands, there would be no visual contrasts resulting from activity associated with the well pad and access road sites.

3.10.3 Cumulative Impacts

The principal past, present, and future actions with the potential for cumulative visual resource impacts include gas exploration, continued coal exploration and mining, timber sales, road and other construction projects, and the reclamation and vegetation management associated with these activities.

Past activities that have affected scenic resources within and adjacent to the well pad sites and access roads include construction of USFS roads and gas and minerals exploration and extraction. These activities have generated limited to extensive visual impacts and have shaped the vegetative patterns and site and roadway scale landforms perceived by viewers of the landscape.

Future alterations would include gas and minerals exploration and extraction and vegetation management activities. There would be a temporary incremental increase in cumulative visual effects resulting from the proposed project. However, intervening landforms help to mitigate the impacts to adjacent visual resources. Higher levels of scenic impacts would occur when alterations approach the ridgelines of watersheds and thus may become visible from more extensive areas. All surface impacts associated with gas and minerals exploration and development on USFS and BLM lands would be required to be reclaimed upon the completion of activities, as stipulated in the individual approvals.

The potential cumulative impacts identified above generally would be applicable to the eight proposed exploratory gas well sites. Based on the information presented in **Table 2-9**, which describes the nature, location, and timing of these actions, the following well sites could contribute to temporary site-specific cumulative visual resource impacts together with other projects located within approximately 1 mile of the well site.

- Leon Lake #4 and #5 – Recompletion activities at the Leon Lake #2 gas well and abandonment of the Leon Lake #1 gas well could result in cumulative impacts with Leon Lake #4 and #5. Potential GEC exploratory well at Spaulding Peak #1, construction of the existing TDS Telecom phone line, and construction of Cole Reservoir #5 and an aqueduct could result in temporary cumulative visual impacts from structures, vegetative clearing, and landform modification at both of these well sites.

- Powerline – Stevens Gulch road hauling (for the Hubbard timber sale), timber clearing for the Stevens Gulch personal use area and the Rifle-Curecanti powerline, and Alder Creek coal exploration could result in temporary cumulative visual impacts from structures, vegetative clearing, and landform modification.

- Bull Park – Based on the locations of the Stevens Gulch road improvements and depending on the timing of these construction activities, a temporary cumulative visual impact could occur in association with surface disturbance for these roads. Timber management activities, including Terror Creek Green Oak and East Terror, surface disturbance associated with the Alder Creek coal exploration and Stevens Gulch #1 exploratory wells and access roads, and surface disturbance for the Rifle-Curecanti powerline and Pitkin Mesa pipeline could result in temporary cumulative visual impacts from structures, vegetative clearing, and landform modification.

- Hubbard Creek – Coal mining activities at Elk Creek and Alder Creek and GEC's exploratory well at Lone Pine #1 could result in temporary cumulative visual impacts from structures, vegetative clearing, and landform modification.

- Oakbrush – Coal mining activities at the Bowie Mine No. 2 and the Elk Creek, Alder Creek, and Oxbow mines could result in temporary cumulative visual impacts. Potential GEC exploratory wells at Lone Pine #1 also could result in temporary cumulative visual impacts depending on the timing of the individual exploration wells from structures, vegetative clearing, and landform modification.

- Hawksnest and Thompson Creek – Construction of the Coal Gulch road improvements, disturbance from the Hawksnest and Sanborn mines, and authorized coal exploration activities could result in temporary cumulative visual impacts from structures, vegetative clearing, and landform modification.

3.10.4 Potential Mitigation Measures

Mitigation measures for visual quality focus on minimizing surface disturbance and reducing visual impacts in the design of project structures, earthwork, and activities. Potential impacts of the Proposed Action could be further reduced for visual resources by implementing the following mitigation measure. Additional protection measures for visual resources would be provided by implementing timber cutting practices as discussed in Section 3.5.2, Mitigation Measure V-2.

VR-1: Scallop horizontal and vertical edges of vegetation surrounding the site.

3.11 Cultural Resources

3.11.1 Affected Environment

Cultural resources on federal lands are protected by federal laws enacted to prevent resource damage or loss due to federally funded or permitted activities. The public's recognition that these non-renewable resources are important and should be protected began very early in this century and continues to the present. New directions and emphases that have come to the forefront over the past 10 years include the Native American Graves Protection and Repatriation Act (NAGPRA), Executive Order 13007, the consideration of historic and traditional landscapes, and the increased awareness of and consultation for traditional cultural properties. Three of the most important laws are the National Historic Preservation Act (NHPA) of 1966, as amended; the American Indian Religious Freedom Act (AIRFA) of 1978; and the Archaeological Resources Protection Act of 1979. Executive Order 11593 also provides necessary guidance on protection and enhancement of cultural resources.

The study area for the cultural resources analysis includes the well pad sites and associated access roads. This applies to both the Proposed Action and cumulative effects areas. Under authority of the mandated policies described above, the study area was examined to locate any cultural resources within the potential area of effect of the proposed undertaking. Section 106 of the NHPA requires federal agencies to assess the effects of federal undertakings on historical and archaeological sites. This is accomplished by inventorying the area of effect, evaluating site importance and eligibility to the National Register of Historic Places (NRHP), assessing the effect of the undertaking on significant sites, and consulting with appropriate historic preservation agencies.

3.11.1.1 Culture History

Radiocarbon dates obtained from archaeological sites throughout west-central Colorado indicate a nearly continuous aboriginal occupation of the area over the past 10,000 years. There are four cultural units or stages represented in the project area: Paleoindian Stage (10,000 through 5,500 B.C.), Archaic Stage (5,500 B.C. through 500 A.D.), Formative Stage (500 through 1200 A.D.), and Proto-Historic/Historic Stage and Ute Tradition (1200 through 1881 A.D.).

The Paleoindian Stage is characterized by the hunting of Pleistocene megafauna and the use of large, lanceolate projectile points. Paleoindian sites are ephemeral, reflecting periodic movement of camps to areas where animals might be found. In the region of the project area, this stage is represented by surface finds of Clovis, Folsom, Hell Gap/Agate Basin, Cody Complex, James Allen points, and others.

The Archaic Stage is characterized by the transition from a primarily nomadic, hunting-base subsistence to a hunting-gathering/semi-sedentary subsistence. Archaic bands exploited generally arid environments where food resources were widely dispersed and where constant mobility was adaptive. This stage is represented by various stemmed and side and corner-notched projectile point types, including McKean, Pelican Lake, Mount Albion Complex, and others. The remains of such structures as pithouses and wickiups, and storage cists, also are associated with this stage.

The Formative Stage is represented in this region predominately by the Fremont culture, which is characterized by a hunting/gathering subsistence supplemented by maize horticulture. The Fremont built semi-subterranean pithouses, surface jacal and masonry habitation units, and coursed adobe granaries. Projectile point types reflect a transition to smaller, notched types.

The Protohistoric/Historic Stage in the region is dominated by the Ute Tradition, which is identifiable as early as 1200-1300 A.D. It is characterized by ceramics, small, tri-notched or side-notched, concave-based projectile points, rock art, and occasional wickiups.

The Euroamerican history of this region is represented by a series of socioeconomic themes: Early Exploration and Fur Trade (1760-1876), Ute-Euroamerican Contact (1640-1889), Ranching/Farming (1870-1945), Railroading (1871-1934), and Coal Mining (1872-1945).

The reader is referred to the following documents for a more in depth recounting of the culture history: *West Central Colorado Prehistoric Context* (Reed 1984) and *Colorado Plateau Country Historic Context* (Husband 1984).

3.11.1.2 Cultural Resources Investigations

In the spring and summer of 2002, Metcalf Archaeological Consultants, Inc. (MAC) conducted cultural resource investigations, which included file searches and field surveys, for the proposed exploratory drilling project. The inventories covered the proposed well pads and associated access roads. A file search covering these project areas was conducted through the Office of Archaeology and Historic Preservation (OAHP) in Denver for all of the proposed well pad sites and associated access roads. File searches also were conducted at the GMUG National Forests office for the proposed Powerline, Bull Park, Hubbard Creek, Oakbrush, and Leon Lakes #4 and #5 well pad sites and associated access roads and at the BLM Uncompahgre Field Office for the proposed Thompson Creek and Hawksnest well pad sites and associated access roads. The records indicate that several previous surveys have been conducted in the vicinity of each project area for various projects (e.g., coal/mining, access roads, transmission line, and timber sales). A brief description of the inventory of each well pad site and access road is presented below.

Leon Lake #4 and Access Road

The file search conducted through the OAHP for the proposed Leon Lake #4 well pad site and associated access road revealed no previous surveys and no previously recorded sites within the project area. In the summer of 2002, MAC conducted field surveys of the proposed well pad site and a 200-foot-wide corridor centered on the associated access road centerline. The larger survey corridor for the access road was to accommodate other project components that were being considered at the time. One historic site (5DT1473) was recorded during the field survey. This site consists of four features in a 165- by 102-foot area: the stone wall remains of a house, a wood outhouse, a dendroglyph (aspen carving), and a wall remnant. The site was recommended by the field archaeologist as not eligible for inclusion on the NRHP; no further work was recommended (Brogan 2002). In a letter dated October 21, 2002, the Colorado State Historic Preservation Officer (SHPO) concurred with the eligibility assessment for site 5DT1473 (McKibben 2003).

Leon Lake #5 and Access Road

No previous surveys or previously recorded sites were identified within the project area as a result of the file search conducted through the OAHP for the proposed Leon Lake #5 well pad site and associated access road. In the summer of 2002, MAC conducted field surveys of the proposed well pad site and a 200-foot-wide corridor centered on the associated access road centerline. The larger survey corridor for the access road was to accommodate other project components that were being considered at the time. No cultural resource sites were located during the field survey (Pennefather-O'Brien 2002).

Powerline and Access Road

The file search conducted through the OAHP and at the GMUG National Forests office in Delta revealed that most of the proposed well pad site and all of the associated access road are within previously inventoried timber sale tracts along the Rifle-Curecanti transmission line corridor. These timber sales were inventoried in 1975. In addition, the transmission line (renamed the Rifle-San Juan line) was inventoried in 1982. No previously recorded sites were identified within the proposed Powerline well pad site and associated access road. In the summer of 2002, MAC surveyed the proposed well pad site and a 100-foot-wide corridor centered on the access road centerline for cultural resource sites. No cultural resource sites were located during the field survey (O'Brien 2002a).

Bull Park and Access Road

The file search conducted through the OAHP and at the GMUG National Forests office in Delta for the proposed Bull Park well pad site and associated access road revealed no previous surveys and no previously recorded sites within the project area. In the summer of 2002, MAC surveyed the proposed well pad site and a 100-foot-wide corridor centered on the proposed access road centerline for cultural resource sites. No cultural resource sites were located during the field survey (O'Brien 2002b).

Hubbard Creek and Access Road

Two previous surveys were identified as a result of the file search conducted through the OAHP and at the GMUG National Forests office: the East Terror Oakbrush Control Project (1978) (as cited in O'Brien 2002c) and a 1979 coal lease project. No previously recorded sites were identified within the proposed Hubbard Creek well pad site or associated access road. In the summer of 2002, MAC surveyed the proposed well pad and a 100-foot-wide corridor centered on the proposed access road centerline. No cultural resource sites were identified during the field survey (O'Brien 2002c).

Oakbrush and Access Road

The file search conducted through the OAHP and at the GMUG National Forests office in Delta for the proposed Oakbrush well pad site and associated access road revealed one previous survey in the project area. The East Terror Oakbrush Control Project (1978) area includes the current project area, but it is likely that the proposed well pad site and associated access road were not intensely inventoried during that

project. No previously recorded sites were identified within the current project area. During the summer of 2002, MAC conducted field surveys of the proposed well pad site and a 100-foot-wide corridor centered on the associated access road centerline. No cultural resource sites were located during the field survey (O'Brien 2002d).

Thompson Creek and Access Road

The file search for the proposed Thompson Creek well pad site and access road was conducted through the OAHP and at the BLM Uncompahgre Field Office. In 1980, one previous survey was completed for a core hole related to coal development, encompassing most of the proposed well pad site and part of the proposed access road. The remainder of the proposed access road is within a 1979 coal lease inventory block. No previously recorded sites were identified in the current project area. In the summer of 2002, MAC surveyed the proposed well pad site and a 100-foot-wide corridor centered on the associated access road centerline for cultural resource sites. No cultural resource sites were located during the field survey (O'Brien 2002e).

Hawksnest and Access Road

Three previous surveys were identified as a result of the file search conducted through the OAHP and at the BLM Uncompahgre Field Office. In 1979, one coal lease inventory was completed, which includes the entire current project area. In addition, two inventories for coal holes related to coal development overlap with the current project area. No previously recorded sites were identified within the current project area. During the summer of 2002, MAC conducted field surveys of the proposed well pad site and a 100-foot-wide corridor centered on the associated access road centerline. No cultural resource sites were located during the field survey (O'Brien 2002f).

3.11.1.3 Native American Religious Concerns

Federal agencies are directed by a suite of federal mandates to consult with Native American tribes concerning the identification of cultural values, religious beliefs, and traditional practices of Native American people that may be affected by actions on federal lands. These federal mandates include: the NHPA of 1966, as amended; NAGPRA of 1990, as amended; AIRFA 1978; and Executive Order 13007 – Indian Sacred Sites. Native American consultation includes the identification of places (i.e., physical locations) of traditional cultural importance to Native American tribes. Places that may be of traditional cultural importance to Native American people include, but are not limited to, locations associated with the traditional beliefs concerning tribal origins, cultural history, or the nature of the world; locations where religious practitioners go, continuous and ongoing, to perform ceremonial activities based on traditional cultural rules or practice; burial sites; and places from which plants, animals, minerals, and waters possessing healing powers or used for other purposes, may be taken.

In compliance with the above described mandates, a Native American consultation letter has been sent to all federally-recognized Native American groups either residing in or with cultural ties to the proposed project area. The letter informed these parties of the proposed undertaking and solicited their concerns/comments regarding the proposed project. A total of three applicable Native American groups have been sent letters:

Ute Mountain Ute Tribe, Southern Ute Tribe, and Northern Ute Tribe. At this time, none of the contacted Native American groups has commented on or expressed concerns about the proposed exploratory gas drilling project.

3.11.2 Environmental Consequences

3.11.2.1 Proposed Action

Cultural Resources

Direct impacts could occur to archaeological sites if present in proposed areas of disturbance. However, archaeological surveys conducted at each proposed well pad site and associated access road located only one site. The site (5DT1473) consists of four features: the stone wall remains of a house, a wood outhouse, a dendroglyph, and a wall remnant. This historic site was evaluated by the field archaeologist as not eligible for inclusion on the NRHP; no further work was recommended. The Colorado SHPO has concurred with these findings (McKibben 2003). Thus, no direct impacts to NRHP-eligible sites would occur as a result of the proposed project.

Construction activities could adversely affect undiscovered archaeological and historic sites. Cultural resource inventories may not locate all significant sites. Buried sites, in particular burials, may be missed in the course of field investigations. If previously undocumented sites, subsurface cultural material, or burials were discovered during ground-disturbance activities, the operator would notify the USFS or BLM as applicable. The discovery would be left intact until the permission to proceed is given by the USFS or BLM (see Section 2.5).

Native American Concerns

In compliance with Section 106 of the NHPA, the USFS initiated government-to-government consultation with the Ute Mountain Ute Tribe, Southern Ute Tribe, and Northern Ute Tribe. Every effort will be made by the USFS to identify places of traditional or religious significance to the tribes and to address any concerns the tribes may have about the proposed project. If traditional use or sacred sites were identified by the tribes within the proposed project area, they would receive the appropriate level of protection or recovery by implementing mitigation measures, treatment plans, or compliance actions (e.g., protection of burial sites). Any mitigation measures, treatment plans, or compliance actions would be developed in consultation with the Ute tribal governments.

The consultation process remains open for any tribal member that expresses a desire for participation when a traditional use or sacred site may be affected by the proposed project. At this time, no traditional use or sacred sites have been identified by the Ute tribes within the proposed project area.

3.11.2.2 No Action

Under the No Action Alternative, no impacts to cultural resources or identified traditional cultural properties would occur.

3.11.3 Cumulative Impacts

Past, present, and future actions with the potential for cumulative cultural resource impacts include any ground disturbing activities within the cumulative effects area. No impacts to NRHP-eligible sites were identified in the proposed project area. At this time, no traditional cultural properties have been identified by the Ute tribal governments. Therefore, the eight proposed exploratory gas well sites are not expected to contribute to cumulative impacts to cultural resources or traditional cultural properties.

3.11.4 Potential Mitigation Measures

Potential impacts to cultural resources would be further protected by implementing the following mitigation:

CR-1: Equipment operators would caution project-related personnel that the removal, injury, defacement, or alteration of any object of archaeological or historic interest is a federal crime and may be punishable by fine and/or jail term.

CR-2: In addition to the project design features that would be implemented in the event of an unanticipated discovery of cultural materials (e.g., antiquities or other objects of historical or scientific interest, including, but not limited to prehistoric or historic ruins or artifacts) or burials, the operator would stop work in the vicinity of the discovery. The appropriate jurisdictional federal agency (USFS or BLM) would determine the best option for avoiding or mitigating site damage, prior to authorizing permission to proceed.

3.12 Transportation

3.12.1 Affected Environment

The study area established to assess the potential transportation impacts from the proposed exploration program and the cumulative effects area includes segments of state, county, BLM, and USFS road networks in Delta County and northwest Gunnison County that would be used for motor vehicle travel by contractors, employees, inspectors, and others in conjunction with the Proposed Action. More specifically, it is those route segments designated for use by the drilling and completion rigs and large trucks traveling to, from, and between the eight well sites (see Appendix B, **Figures B-1** through **B-8**). The study area reflects the geographic locations of the proposed wells and the principal highway access routes to and between those sites. The emphasis is on four key road and highway segments that serve commuting, intra-, and inter-regional commerce and tourism travel. These routes include:

- SH 65 north from its junction with SH 92 east of Delta through Orchard City, Cedaredge, and up to the Grand Mesa National Forest;
- SH 92 east of Delta, past its junction with SH 65 and over to Hotchkiss;
- U.S. Highway (U.S. Hwy) 50 in and near the city of Delta; and
- SH 133 east of Hotchkiss, past Paonia and Somerset to its intersection with the Kebler Pass Road.

Local roads affected by project-related traffic include Delta CR U.50, 2500 DR, and CR 40.10 (Stevens Gulch). These roads serve primarily local needs including commuting, education transportation, and recreation access. Three USFS roads, FR 125, 127, and 701 (Stevens Gulch); a BLM road, the Bear Creek Road, and the jointly USFS/BLM-administered Coal Gulch Jeep Trail, would provide access to one or more of the eight well sites. These roads provide public recreation, access for a range of activities including hunting, livestock management by ranchers with grazing permits in the area, management and maintenance of water resources, as well as facilitating agency management of the area.

The Proposed Action creates a potential need for hauling and disposal of produced water from one or more of the eight exploratory wells. Should hauling be required, the selected disposal site is located in Mesa County, north of the Grand Mesa and outside the study area. The designated haul route involves use of the site-specific access roads to connect to U.S. Hwy 50 in Delta, then north to SH 141 in Mesa County, SH 141 north to Interstate (I)-70, east to DeBeque, and then south on Mesa CR 45.5.

Current transportation conditions were examined on segments of the highway network that would serve as the access routes for project-related traffic and also are important for intra- and inter-regional vehicular travel. Rail transportation is addressed to the extent necessary to establish the interface between the highway and rail system networks represented by highway-railroad crossings. Aviation transportation conditions are not addressed because of the lack of foreseeable linkages between the Proposed Action and air transportation.

Table 3.12-1 profiles the selected road segments in terms of the number of travel lanes, surface type, and the existence of at grade highway-rail intersections. Portions of U.S. Hwy 50 and SH 92 in and near the city of Delta have four lanes, but most of the potentially affected highway system consists of two-lane, paved roads. The three Delta CRs are two-lane paved facilities at their junctures with the state highway system. However, about 1.5 miles from those junctures, both 2500 DR and CR 40.10 become graveled surface roads. The USFS and BLM roads are unpaved.

Table 3.12-1
Potentially Affected Highways and Roads

Highway/Road Segment	Travel Lanes	Surface Type(s)	At Grade Highway-Rail Crossings
U.S. Hwy 50, Near Delta	4	Paved	Yes
SH 65, from SH 92 to GMUG National Forests	2	Paved	Yes
SH 92 West of Delta to SH 65	4	Paved	No
SH 92 West of SH 65 to Hotchkiss	2	Paved	Yes
SH 133 West of Hotchkiss, through Paonia and Somerset, to Paonia Reservoir	2	Paved	Yes
Delta CR U.50	2	Paved	No
2500 DR	2	Paved and Unpaved gravel	Yes
CR 40.10 (Stevens Gulch)	2	Paved and Unpaved gravel	No
FR 125,127, and 701 (Stevens Gulch), Bear Creek Road and Coal Gulch Jeep Trail	2 or 1	Unpaved gravel or dirt	No
SH 141, U.S. Hwy 50 to I-70	2	Paved	Yes
I-70	4	Paved	No
Mesa CR 45.50	2	Paved	Yes

Sources: CDOT 2003; U.S. Federal Railroad Administration 2003; Delta County 2002.

All of the roads are open to public travel. The paved roads are either state or county maintained and are open year-round. Winter weather and spring thaw create seasonal closures of the FRs. FR 701, FR 125, and FR 127 are closed during spring until the road conditions are dry enough to support traffic without causing road damage. The portion of FR 125 proposed for project use and FR 701 are both graveled and suitable for passenger cars, mobile homes, and other light-duty vehicles. Travel on FR 127 is limited to 4WD, ATVs, and trail motorcycles. ATV and mountain bike use is permitted on several trails in the area. Other than travel to retrieve downed game during the big game hunting season, motorized travel on the affected portion of the Grand Mesa National Forest is restricted to designated roads and trails. These restrictions are in place to protect existing resources and roadless areas in the region. FR 701 is in an area of the Gunnison National Forest that is open to motorized travel on established roads and trails, and within 300 feet of such roads and trails for limited activities, provided that travel does not damage or unreasonably disturb the land, wildlife, or vegetation. It serves as a haul route for timber harvests in this portion of the forest and a key southern access route for coal exploration drilling traffic, recreation, hunting, and other uses. Travel on Coal Gulch is restricted to 4WD vehicles and is a popular ATV route, and limited to designated routes once it enters the Gunnison National Forest.

The Bear Creek road passes through BLM and private land. Existing use includes access to a private ranch, hunting outfitters and guides, access to Oxbow Mining's federal coal lease, and a proposed access to GEC Lone Pine #1 well.

The USFS and BLM are responsible for maintaining roads under their control at standards established by the respective agencies that also are consistent with the resource and travel management plans and the design, function, and use of the road. A series of road maintenance levels defines the level of service provided by, and maintenance required for, specific roads. Road maintenance levels, divided into a five-point scale from 1 to 5, with higher numbers indicating higher maintenance, consider factors such as resource program needs, user safety, functional classification, surface type, and protection of prior road investments. The current road maintenance levels for the affected USFS and BLM roads are shown below.

Table 3.12-2
Current Road Maintenance Level Objectives

USFS/BLM Road	Maintenance Level
FR 125	3
FR 127	2
FR 701 (Stevens Gulch)	4
Coal Gulch Jeep Trail	2
Bear Creek Road	2

Note: Maintenance levels are as follows:

1) Minimal maintenance, roads may be closed or no longer needed, vehicular traffic prohibited or eliminated.
2) Roads open to use by high clearance vehicles, low traffic volumes, mostly administrative or specialized uses (e.g., timber hauling).
3) Roads open seasonally or year-round for general travel including passenger cars and other low clearance vehicles.
4) Roads that are open year-round, with aggregate or bituminous surfaces, connecting key facilities and sites to other local, state, and federal roads, often providing double lanes and accommodating moderate travel speeds.
5) Normally double lane, paved facilities, open year-round, and providing a high degree of user comfort and convenience.

SH 141 connecting I-70 to U.S. Hwy 50 in Mesa County is a designated primary truck route and hazardous materials haul route.

The CDOT reports annual average daily traffic volumes (AADT) for all state and federal highways in the state. Reported traffic volumes are based on actual counts at selected locations, with estimates for the intervening road segments. Current traffic conditions, reflecting 2001 data, for the selected routes are summarized in **Table 3.12-3**.

Traffic patterns and trends on the affected roads and highways include the following:

- The highest AADT traffic volumes in the region of influence occur along U.S. Hwy 50, particularly as it proceeds through the City of Delta. In 2001, AADT on U.S. Hwy 50 ranged from about 9,200 to nearly 22,700 AADT.

Table 3.12-3
Annual Average Daily Traffic Volume
Selected Highway Segments in Delta County, 2001

Road Segment – Description	AADT (Average)	Truck AADT	Trucks (%)	Volume/ Capacity
SH 65 (South to North)				
North of SH 92, Delta CR Q.25 On south side of Cedaredge	6,706	309	4.6	0.44 - 0.58
Cedar Mesa Street to Boulder Avenue – Cedaredge	3,551	165	4.6	0.22
Bruce Street to Delta CR S.00 north of Cedaredge	2,127	124	5.8	0.11
At Delta CR U.50	801	60	7.5	0.04
North of Delta CR U.50 into the Grand Mesa National Forest	776	67	8.6	0.06
At Ward Lake Recreation Area	474	36	7.6	0.04
U.S. Hwy 50 (Selected Segments Near Delta, North to South)				
Delta CR G.50 to Delta CR 15.75 NE of Delta	9,486	836	8.8	0.66 - 0.71
At Junction with SH 92	7,284	1,057	6.1	0.67
In town of Delta, 2nd Street to 7th Street	18,043	1,383	7.7	0.52 - 0.73
In town of Delta, 11th Street to Meeker Street	9,914	757	7.6	0.38
SH 92 West of Delta (West to East)				
Junction of SH 50 to Delta CR 16.75	12,682	711	5.6	0.51
At Junction SH 65	5,010	278	5.5	0.19
Delta CR 20.75 to Delta CR 31.00	4,415	278	6.3	0.27 - 0.34
At Junction with SH 133 in Hotchkiss	3,032	150	4.9	0.20
SH 133 West of Hotchkiss (West to East)				
In town of Hotchkiss, west of Junction SH 92	5,498	301	5.5	0.36
Hotchkiss to Delta CR L.25	4,292	255	5.9	0.28
At Junction SH 187 south to Paonia	3,040	157	5.2	0.20
In Somerset	2,172	61	2.8	0.33
SH 141, U.S. Hwy 50 to I-70	11,500[1]	700[1]	6.0[1]	0.50[1]
I-70, Clifton to Debeque	15,800[1]	1,950[1]	12.0[1]	0.35[1]
Mesa CR 45.5	382	N/A	N/A	N/A

[1]Estimated

Sources: CDOT 2003; Mesa County 2003.

- Traffic volume on SH 65 sharply declines proceeding northward from its intersection with SH 92. Traffic volume is above 7,100 AADT on the south, declining to about 3,600 AADT entering into Cedaredge from the south. Traffic volume declined to 801 AADT at Delta CR U.50 north of Cedaredge and fell below 500 AADT as SH 65 enters the Grand Mesa National Forest.

- Traffic volumes generally decline proceeding eastward across Delta County. Traffic on SH 92 at U.S. Hwy 50 in the city of Delta is nearly 12,700 AADT. Traffic volume declines to about 5,000 AADT by the time SH 92 reaches the junction with SH 65, and continues to fall, reaching about 3,000 AADT in Hotchkiss.

- AADT traffic along SH 133 exhibits similar patterns, declining from about 5,500 AADT in Hotchkiss to just over 2,100 AADT through Somerset.

- Truck traffic volumes on the selected roads range from a low of 36 trucks per day on SH 65 near the Ward Lake Recreation Area to nearly 1,400 trucks per day on U.S. Hwy 50 through Delta.

- Truck traffic, as a share of total AADT, accounts for between 4.6 and 7.6 percent of traffic on most of the key road segments. The overall range of truck volumes are from 2.8 to 8.8 percent of AADT.

- Truck traffic volumes on SH 65 generally parallel overall AADT, declining from over 300 trucks daily on the southern portion to fewer than 70 trucks daily on the north.

- SH 133 is the primary highway access route for three operating coal mines in Delta and Gunnison counties. The mines employ approximately 900 workers who commute to and from the mines via SH 133. The mines also generate substantial volumes of heavy truck traffic delivering equipment and supplies. Some truck haul of coal from the mines to rail loadouts occurs over SH 133.

- The corridors defined by the key highways are primarily rural, characterized by agriculture use, scattered residential development or open undeveloped range. The level of development is higher where the highways pass through or near the communities of Delta, Cedaredge, Orchard City, Hotchkiss, Paonia, and Somerset. The highways pass through school zones in several of those communities.

- Comparable traffic volumes and other data are not available for the other local roads. Based on their location, the types and levels of development located along the affected segments, and the AADT volumes on the major routes, average traffic volumes on these roads are likely in the range of 50 to 400 vehicles per day.

The CDOT reported volume-to-capacity (V/C) ratios for the selected road segments also are shown in **Table 3.12-3**. The V/C ratios, based on the 30th highest hour traffic volumes and estimated roadway traffic capacity, are one measure of roadway system performance. Capacity estimates reflect the number and width of lanes, terrain, presence and width of shoulders, and other factors. V/C ratios below 0.70 generally indicate free-flowing traffic with few or no delays and correspond to high levels of service for motorists. As

shown above, V/C ratios are well below 0.70 on almost all of the key highway segments. The exceptions are for several segments on U.S. Hwy 50 in and near Delta where the ratios are slightly above the 0.70 threshold.

The segment of SH 65 from Cedaredge north through the GMUG National Forests and across the Grand Mesa to its connection with I-70 has been designated as the Grand Mesa Scenic and Historic Byway. It is one of 81 routes designated by the U.S. Department of Transportation (USDOT) as All American Roads and National Scenic Byways. Because of that distinction, the Grand Mesa Scenic and Historic Byway and the outdoor recreation opportunities in GMUG National Forests factor prominently in regional travel and tourism promotion efforts. The segment of SH 133 through the study area is part of the 205-mile West Elk Byway Loop. This route, designated by the USFS and Colorado Scenic and Historic Byways program, circles around the West Elk Wilderness with a spur up to Carbondale.

Estimates of monthly or annual traffic volumes are not available for local roads in Delta County. However, traffic volume throughout the region exhibits considerable seasonal variation due to increased summer tourism and recreation. Data for other summer tourism destinations on the western slope indicate that traffic volumes tend to be lowest in January, about 30 percent below the AADT. The highest traffic volumes occur in July and August, about 30 to 40 percent higher than the AADT. Applied to the traffic volumes on SH 65 near the Ward Lake Recreation Area and at the southern boundary of the GMUG National Forests yields estimated summer traffic volume increases of 190 to 310 vehicles per day during July and August. Thus, peak summer traffic may be as high as 1,100 AADT on SH 65 near Delta CR U.50.

The presence of at-grade highway-rail grade crossings arises in conjunction with the Union Pacific Railroad Company's North Fork branch line. From its division point in Delta, the North Fork branch generally parallels SH 92 and SH 133 up the North Fork River valley to its terminus near the West Elk mine east of Somerset. The line's primary purpose is to transport coal produced by the Oxbow, Bowie, and West Elk mines to market. The line also provides general freight service for industrial and agricultural users in the region.

Records from the Federal Railroad Administration indicate 64 highway-rail at-grade crossings along the North Fork branch: 38 public crossings involving one or more public access roads or highways and 26 private crossings involving a private driveway. Daily traffic on the line averages less than three trains per day, primarily unit-coal trains of 100+ railcars each. Train speeds along the line vary between 15 and 30 miles per hour. Eight highway-rail incidents or vehicle/train collisions were reported along the North Fork branch from January 1998 through November 2002. Five of those collisions occurred at public crossings, three at private crossings. Two of those accidents resulted in injuries to a total of three motorists. No fatalities have been reported due to vehicle/train collisions in Delta County during the 5-year period studied. There are no grade-separated rail crossings, that is, over or underpasses, on the North Fork branch (Federal Railroad Administration 2003).

3.12.1.1 Inventoried Roadless Areas

The U.S Department of Agriculture (USDA) proposed the "Roadless Area Conservation Rule" (36 CFR Part 294) to establish prohibitions on road construction, road reconstruction, and timber harvesting in IRA on NFS Lands. The purpose of the rule is to sustain the health, diversity, and productivity of the nation's forests

and grasslands to meet the needs of present and future generations. This rule prohibits road construction, reconstruction, and timber harvest in IRAs because they have the greatest likelihood of altering and fragmenting landscapes, resulting in immediate, long-term loss of roadless area values and characteristics. Implementation of the RACR is pending.

There are 5 categories of NFS Lands within the GMUG National Forests: IRAs that allow road construction and reconstruction; IRAs that do not allow road construction and reconstruction; IRAs recommended as wilderness; Designated Areas outside of IRAs; and, All Other NFS Lands. In the GMUG National Forests, 1,038,000 acres (35 percent) are categorized as IRA (allows road construction and reconstruction), 89,000 acres (3 percent) are categorized as IRA (does not allow road construction and reconstruction), 555,000 acres (19 percent) are categorized as Designated Areas outside of IRAs, and 1,276,000 acres (43 percent) fall under All Other NFS Lands. There are no areas categorized as IRAs recommended as wilderness.

None of the proposed well pad sites are located within an IRA. The Thompson Creek well pad site is located on BLM land approximately 93 feet from the Springhouse Park IRA, and the Bull Park well pad site and new spur access road are located on USFS land 600 feet from the Priest Mountain IRA. The Powerline well pad site is located approximately 630 feet from the Priest Mountain IRA boundary.

3.12.2 Environmental Consequences

3.12.2.1 Proposed Action

Impacts Applicable to All Sites

Potential transportation impacts of the Proposed Action would arise primarily due to increases in vehicular traffic, including oversize/overweight trucks on access roads and temporary delays associated with planned road improvements and construction activities. Such delays would only affect recreationists and other travelers using the USFS and BLM roads during periods of actual road construction. Approval of the Proposed Action would not adversely alter the established public use or access to the USFS and BLM roads.

Estimated project-related truck traffic requirements for road and well pad construction, drilling, completion, and initial reclamation activities for a single well are shown in **Table 2-5**. The estimated number of trips reflects the planned sequence and duration of activity associated with drilling and completing each well. In turn, the drilling and completion plan is predicated on assumptions regarding the geology, depth of well, drilling methods used, and other variables that influence the actual work progress. As such, the plan represents a reasonable schedule. From a transportation perspective, the plan assumes that one drilling rig and one completion rig would be used, which compresses the flow of oversize/overweight trips into the shortest timeframe. Unexpected delays in the drilling and completion could result in additional light-duty truck traffic for a period of time but would tend to spread the heavy truck traffic over a longer period, reducing volume-related impacts. Design features of the Proposed Action related to transportation, including restrictions on travel to approved locations, prohibition on truck travel on the USFS and BLM roads during winter closures, and movements of heavy trucks on weekends, closure of newly constructed roads to

motorized public use, and adherence to specifications and standards regarding road design, drainage and erosion control, construction and maintenance, would act to limit or avoid potential transportation impacts. For example, the prohibition on truck travel during winter closures avoids potential direct conflicts with snowmobile use.

In addition to NEPA compliance, the Proposed Action is subject to a separate Roads Analysis under 36 CFR 212 and USFS Interim Directive 1920-2001-1. The purpose of the Roads Analysis is to provide line officers with critical information to develop USFS road systems that are safe, responsive to public needs, efficiently managed, have minimal adverse ecological effects, and are in balance with available funding. The Roads Analysis, prepared by an interdisciplinary team concurrently with this EA, is available for public review at the GMUG office.

Estimates of the project-related traffic requirements for the complete eight well exploratory program were developed using the information in **Table 2-5** and information provided by GEC in terms of well drilling and completion sequencing. Well completion activities would begin about 2 weeks after drilling starts. The planned sequencing of wells is shown in **Figure 2-10**.

The proposed drilling and completion program is to be completed in a 75- to 80-day period. Estimated project-related truck traffic ranges from 8 to 103 trips per day and averages about 35 trips per day during that period. Approximately half of the trips would be "heavy loads" (e.g., involving tractor-trailer combinations operating within normal length and weight limits or oversize/overweight trucks requiring special permits).

The well sequencing plan and use of multiple access routes, distributes project-related traffic across the affected road network. Under a scenario that likely overstates the truck traffic impacts, the four-lane segment of SH 92 east of Delta to its intersection with SH 65 would be affected by all project-related truck traffic (see **Figure 3.12-1**). Existing AADT traffic volume on this segment varies between 10,800 and 13,000 AADT, with over 700 trucks per day. Relative to the existing traffic, the project-related traffic represents less than a 1.0 percent increase in AADT on this road segment. During the duration of the drilling and completion program, the average number of truck trips would represent about a 5.0 percent increase in truck traffic on this road segment.

Other segments of the affected road system also would experience increases in traffic due to the Proposed Action. The volume and duration of the increases would vary by major road segment (see **Figure 3.12-2**).

- Estimated truck traffic increases on SH 65 would occur on about 28 days of the total 75- to 80-day program. The peak project-related increase is estimated at 54 trips per day, with an average of 25 trips per day over the 28 days. The increase would be noticeable to residents and other motorists who travel regularly along Delta CR U.50, 2500 DR, and FR 125, but it generally would not be discernible on SH 65 south of Cedaredge. According to the preliminary project sequencing plan, the drilling traffic and that associated with well completion activities would occur about 6 weeks apart during a single season, or they could occur during separate drilling seasons (i.e., different years).

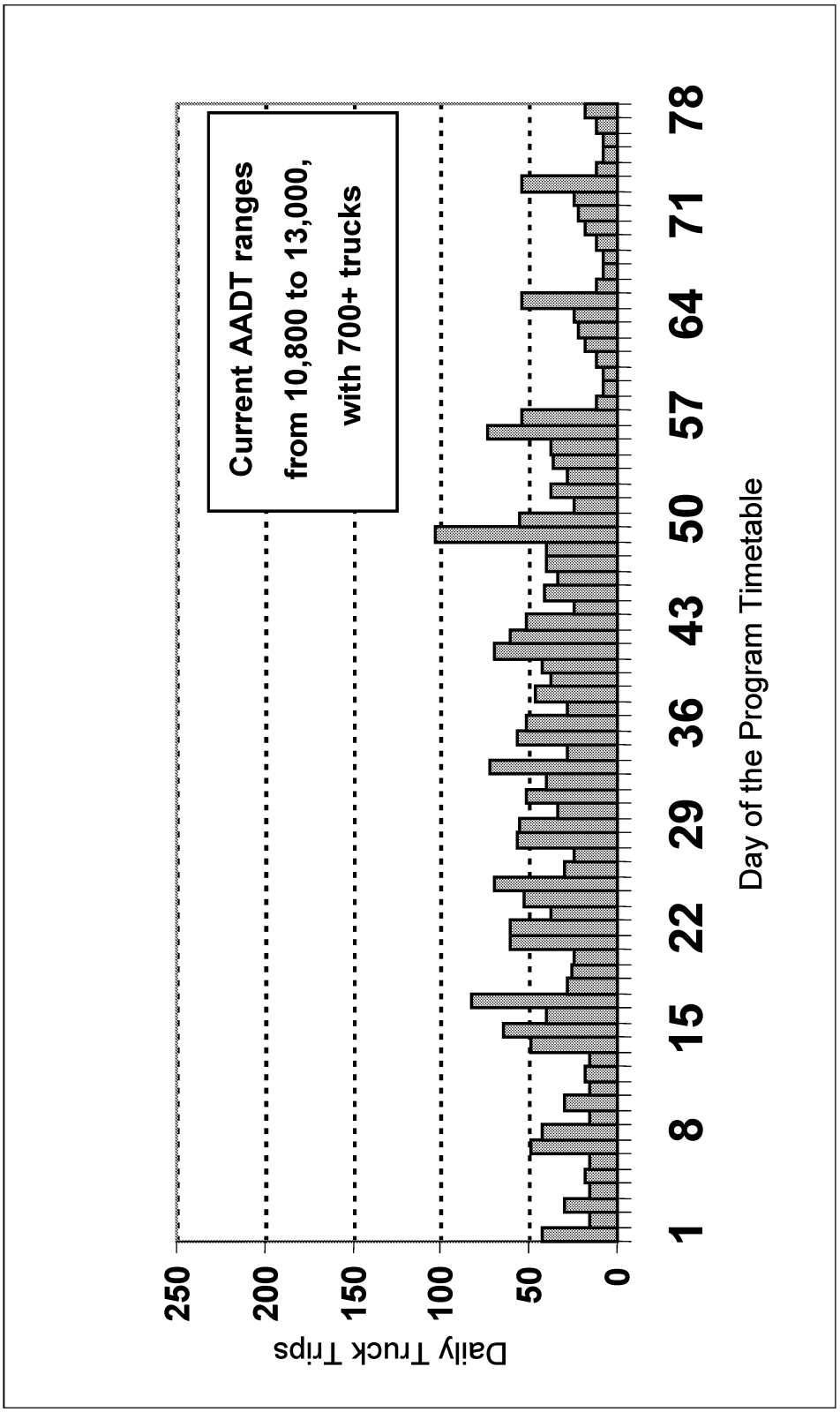
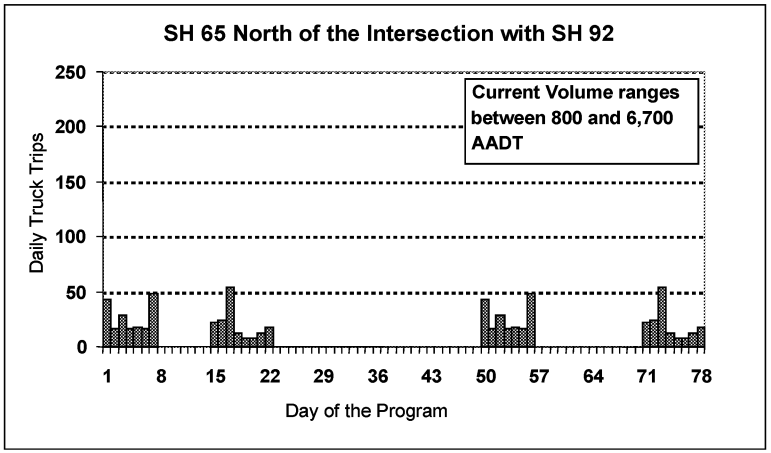
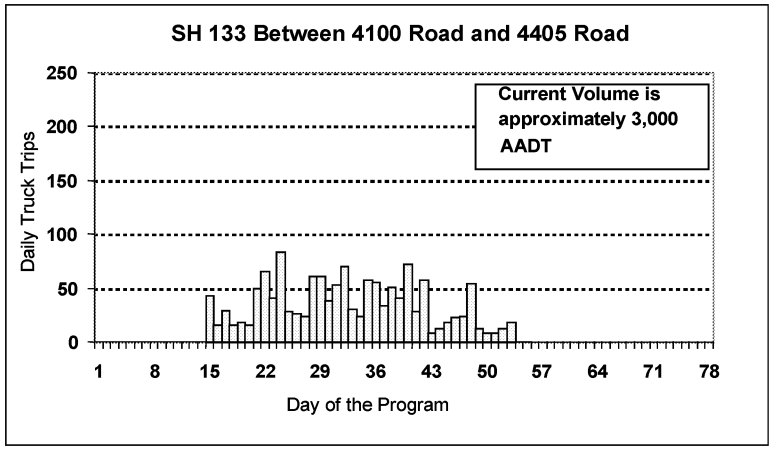
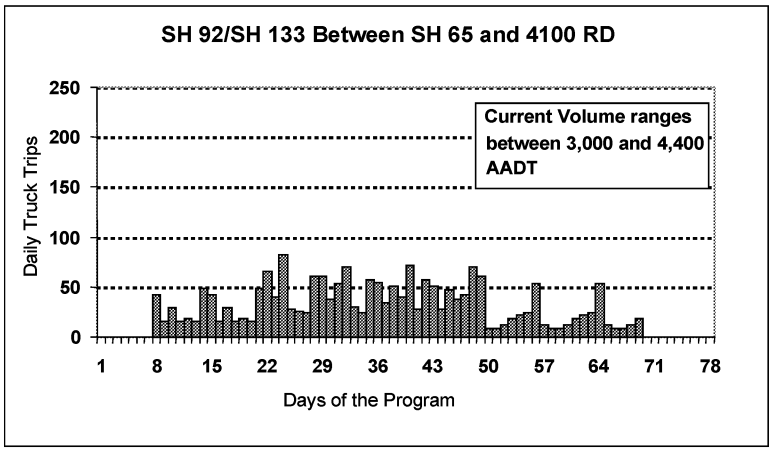


Figure 3.12-1. Project-related Traffic Impacts on SH 92 East of Delta to the Junction with SH 65







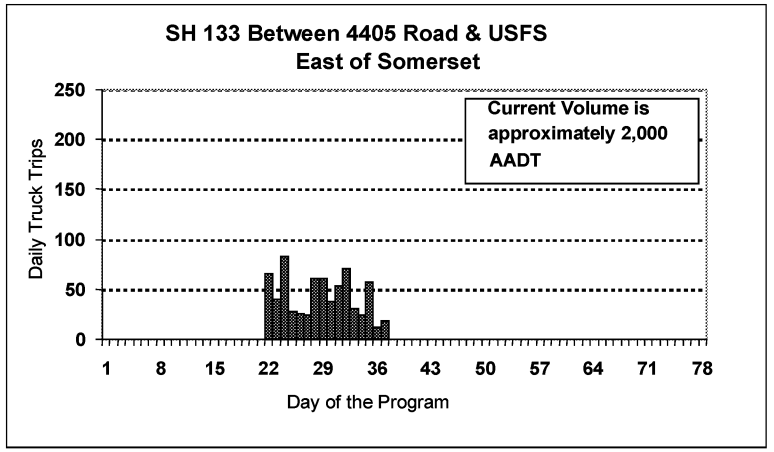


Figure 3.12-2. Project-related Truck Traffic Estimates on Selected Roads

- Project-related truck traffic increases on SH 92 and SH 133 east to 4100 Road would occur on 61 days of the 75- to 80-day program. The peak project-related traffic increase is estimated at 83 trips per day, with an average of 34 truck trips per day. The peak traffic increase would represent less than 3.0 percent of total AADT, averaging about 0.8 percent along SH 92 between SH 65 and Hotchkiss. Projected-related traffic would add to the 150 to 300 trucks that currently travel over those segments of the road network.

- Based on the well locations and access routes, project-related traffic impacts on SH 133 east of 4100 Road would be of comparable magnitudes, but shorter duration, as those on SH 92 and SH 133 west of 4100 Road. Peak truck traffic impacts estimated at 83 trucks per day, averaging 46 truck trips between 4100 Road and 4405 Road, and 23 trips per day east of 4405 Road.

The relative magnitude of the project-related traffic increases for the local access roads; however, existing traffic volumes on these roads are much lower.

The Proposed Action would generate additional traffic during well testing and monitoring, typically a single pickup truck or over the snow vehicle per day. There also would be traffic associated with final reclamation of any well determined to be not economically viable for future production. The timing, magnitude, and duration of such traffic are unknown, but they likely would be considerably below that associated with drilling and completion.

The Proposed Action does present a possibility of one or more wells producing a sufficient volume of water to require offsite disposal. The probability of this occurring and the quantity of water produced are unknown. Should the disposal of produced water be required, GEC has indicated plans to contract with a private firm, using an approved disposal facility, for that service. One such facility, operated by Black Mountain Disposal, is located in Mesa, Colorado. All hauling of produced water to disposal sites would be accomplished using trucks meeting legal size and weight limitations. The project proponent has indicated that contractors used to haul produced water for offsite disposal would be required to use the route around the Grand Mesa to reach the water disposal site, rather than using SH 65 over the Grand Mesa in order to limit potential transportation impact on tourism and recreation use associated with the Grand Mesa Scenic Byway and Grand Mesa National Forest.

Changes in traffic volumes generally correlate to changes in accident rates, road maintenance requirements, and the levels of service for all motorists. The incidence of impacts associated with these changes may be localized or regional in scope. The Proposed Action would result in some temporary, site-specific transportation impacts.

More localized impacts would include an awareness of and exposure to higher traffic volumes for residents along the key highway routes and outdoor recreation visitors, particularly 4WD and ATV enthusiasts, hunters, and grazing permit holders accustomed to historical traffic levels on the FR and BLM roads. The increased traffic on county roads in the project area would temporarily increase the risks of motor vehicle accidents along the affected routes. Established school zones along the route would experience temporary increases in traffic volume and associated hazards.

The increases in risk would be minimal given the duration and magnitude of project-related traffic. Most project-related traffic would occur during the summer months when schools are not in session. Motorists traveling at specific times and in specific locations may experience minor additional delays at intersections. The number of motorists affected would be limited. The probability of livestock/vehicle or wildlife/vehicle collisions on public lands also would increase when periods of grazing use overlap drilling and completion activity. At that same time, motorists would benefit from improvements in road surface, drainage, or geometry put in place as part of the Proposed Action. In the short-term, road improvements made as part of the Proposed Action would reduce USFS and BLM maintenance burdens on the affected road segments by the appropriate local, state, or federal agency. The operator would share in the on-going maintenance of the affected USFS and BLM roads during the life of the exploration program. However, other maintenance requirements could be accelerated by project-related traffic, particularly that by heavy traffic, and by future long-term maintenance on the improved sections.

Upgrade and maintenance on existing roads and improvements to existing roads, described in Section 2.1.2.2, would not alter public access, allowable uses, or seasonal closure or use patterns. Road construction and maintenance standards associated with the Proposed Action would promote public safety, protection from erosion, and maintenance of established access to properties, utilities, and other facilities located along the access roads. The project operator would bear the construction, maintenance, and rehabilitation costs for newly constructed roads, as well as project-required improvements of existing roads. The Proposed Action would not discernibly affect regional travel, including tourism travel along the Grand Mesa Scenic Byway and West Elk Scenic Byway Loop, more so than other ongoing activities in the region that generate temporary and short-duration increases in traffic. The operator's contractors would not use SH 65 over the Grand Mesa for any heavy or oversize/overweight loads, including hauling of produced water. Considering the existing traffic and V/C ratios, seasonal and other ordinary variations in traffic volumes, and the magnitude, duration, and geographic distribution of project-related traffic, the incremental traffic associated with the Proposed Action would not result in discernible regional-scale adverse transportation impacts across the study area.

New spur access roads would end at each well site, and would not connect with any other roads. Public use of these roads would be limited to insure site and public safety. The spur access roads also would be gated to help achieve this goal.

The Proposed Action is consistent with the established travel plans and interim travel restrictions for the affected areas. The consistency determination is based on the following factors: the principal access routes are established classified routes on the National Forest and BLM road systems; the travel management plans allow for development of new roads to meet the access needs of permit holders; such access needs are independent of general public access, and the new roads would not be open to public access. However, project-related access to the lower portions of the Coal Gulch road would improve visitor access and potentially increase recreation and hunting use of the surrounding area. Such changes in use would need to be considered in the pending GMUG LRMP revision and the Sub-basin Roads Analysis reviews.

The Proposed Action would have no effects on the IRAs. However, due to the proximity of the Thompson Creek site to the IRA boundary, there would be potential for encroachment.

Site-specific Impacts

The following impacts are specific to particular well sites or their associated new road spurs:

Leon Lake #4. Delta CRs U.50 and 2500 DR may be more prone to accelerated wear from project-related heavy truck traffic than the state highways. Some residents, visitors, businesses and customers, and visitors/users of the GMUG traveling along these roads would encounter temporary and minimal increases in traffic, along with associated impacts such as increases in risks of accidents and travel delays.

The designated travel routes for project-related traffic pass through several school zones. Temporary increases associated with the project would result in minor increases in traffic-related accident risks within these zones. The increase would be tempered by the limited overlap between the school year calendar and the activity periods associated with the anticipated sequencing schedule and by the fact that many of the trips would occur early and late in the day when schools are not in session. Project-related risks would be tempered even more were the drilling and completion program to occur over several years.

Motorists traveling into the GMUG via FR 125 could experience temporary delays during road improvement and construction activities. A portion of the Green Mountain trail coincides with FR 127, along the proposed route to Leon Lake #4. This trail is used by ATVs, horseback riders, and mountain bikes. There exists a potential for use conflicts when well-related traffic and other use of this road coincide. Some users may temporarily choose to recreate on other parts of the GMUG. Such shifting of use is considered a temporary displacement of use, not an adverse impact.

Site-specific impacts also may include a heightened awareness of and exposure to higher traffic volumes for residents along SH 65, U.50, and 2500 Road north of Cedaredge and recreation visitors, particularly 4WD and ATV enthusiasts, hunters, and grazing permit holders accustomed to historical traffic levels near the Leon Lake wells.

Leon Lake #5. Site-specific issues are similar to those described above for the Leon Lake #4 well site.

Bull Park. Stevens Gulch Road may be more prone to accelerated wear from project-related heavy truck traffic than the state highways. Some residents and businesses and customers along this road, and visitors/users using this road to access the area would encounter temporary and minor increases in traffic, along with associated impacts such as increases in risk of accidents and travel delays. Motorists traveling into the GMUG via FR 701 could experience temporary delays during road matrix activities. Road construction and project-related truck traffic would interact with traffic associated with the previously approved timber harvest and hauling activities associated with the Hubbard timber sale in the Gunnison National Forest during the summer of 2003.

Portions of the Overland Ditch and Fire Mountain Canal lie to the west of the Stevens Gulch Road and FR 701. These ditches supply summer irrigation water for many agricultural operations in the area. Project-related activities would overlap periods of ditch maintenance and operations. Consequently, there would be brief periods of simultaneous use by project-related and irrigation-related use.

Powerline. Site-specific issues are similar to those described above for the Bull Park well site.

Hubbard Creek. Site-specific impacts for this well are primarily potential conflicts with other users on the Bear Creek road. Limited private development adjacent to the road, gates controlling access through private lands, and lack of connections to other roads. Existing use includes traffic related to Oxbow Mining's operations, hunting and outfitting, and use by private landowners. Any traffic conflicts would be minor and temporary. Furthermore, there is little anticipated overlap between the activity periods for the Hubbard Creek anticipated under the proposed sequencing schedule and the big game hunting seasons for the area.

Oakbrush. Site-specific issues are similar to those described above for the Bull Park well site.

Thompson Creek. Site-specific impacts for this well are primarily potential conflicts with other users on the Coal Creek road. Limited private development adjacent to the road, the terrain, and limitations to 4WD use. Existing use includes recreational, hunting, traffic related to Oxbow Mining's operations, ATV use for pleasure, hunting and outfitting, and use by private landowners. Any traffic conflicts would be minor and temporary. However, improvements to the Coal Gulch road could increase public use in the surrounding areas of the GMUG.

Hawksnest. Site-specific issues are similar to those described above for the Thompson Creek well site.

3.12.2.2 No Action

Under the No Action Alternative, the SUPOs and ROW approvals would not be granted. The implications of No Action for transportation are that underlying conditions and trends affecting traffic volumes, the amount of truck traffic, accident rates and locations, and road maintenance would continue, uninfluenced by the direct and secondary activities associated with the drilling, completion, testing, monitoring, and reclamation of the proposed exploratory gas drilling program. Seasonal variations in traffic levels, truck traffic associated with ongoing residential, industrial, and commercial activity, including coal mining and highway maintenance, and the region's agricultural base would continue.

In general, traffic volumes would be expected to increase over time. Even given CDOT's projected traffic growth of 45 percent or more over the next 20 years, the volume/capacity ratios are expected to remain below the 0.70 threshold for virtually all of the affected road segments in the region. The primary exception would be on U.S. Hwy 50 near Delta.

Current and prospective future mineral resource development activities, including coal mining, would continue to exert an influence on transportation conditions. Local, state, and federal government agencies would continue to monitor traffic, developing and implementing transportation improvement plans in response to changing demands, standards and fiscal realities.

3.12.3 Cumulative Impacts

Current transportation system facilities, standards, capacities, and utilization reflect a myriad of past, present, and reasonably foreseeable future actions. In a broad sense, cumulative transportation impacts

arise because of past decisions to locate, develop, and continue to maintain the major access routes. Those decisions reflect factors such as past coal exploration, water resource development, timber harvest and informal recreation, hunting, and firewood gathering. Once established, roads and other transportation facilities not only exert substantial location influence on other actions, but also experience changes in demand in response to changes in the level and location of economic activities and traffic that are largely independent of the local transportation networks. While demand fluctuates as a matter of course, roadway design and capacity are relatively constant in the short-term, and the roadway itself is one of the principal cumulative effects. Furthermore, roadway capacity or safety improvements are predicated on long-term changes in traffic volumes, the priority of a specific need relative to all other road and bridge improvement needs in the region, and funding availability. Because of the factors outlined above, the cumulative assessment focuses on potential temporary cumulative impacts in the future. There would be no long-term transportation impacts from the Proposed Action.

The potential for short-term cumulative transportation effects would arise primarily from concurrent traffic on one or more segments of the existing and proposed access roads associated with the on-going and reasonably foreseeable future actions in **Table 2-9**. Potential impacts include brief and isolated episodes of congestion, reduced travel speeds, delays at intersections, slightly higher accident risks, and additional road maintenance. With the exception of potential effects on road maintenance, such impacts would be temporary and very minor in scale, occurring during the actual periods of travel. No long-term residual impact would occur beyond the approved road improvements.

Potential indirect cumulative impacts could arise in connection with the project proponent's scheduling integration for four exploration wells on private lands in the project area with the plans for the eight well program on public lands. Various factors, many of which are beyond the proponent's control, could prompt changes in the proposed sequencing. Possible options include:

- Interspersing the drilling of the wells on private lands with that of the public wells within a single extended season, while continuing to use a single drilling and a single completion rig;

- Interspersing the private and public wells but completing all wells over multiple seasons, also with a single drilling and a single completion rig; or

- Employing multiple drilling and completion rigs to complete the project within a single season.

From a transportation perspective, the principal effect of these options is to alter the distribution of the project-related traffic across time and place and to increase the total number of trips to reflect the activity associated with the private wells. Those wells would each generate traffic-comparable to those of the public wells described in **Table 2-5**. In other words, gas exploration traffic would occur over a slightly longer period of time, and the window of time may be sooner or later than outlined in the preliminary sequencing plan. Generally speaking, transportation impacts would be comparable under the three options.

The potential cumulative impacts identified above generally would be applicable to the eight proposed exploratory gas well sites. Based on the information presented in **Table 2-9**, which describes the nature,

location, and timing of these actions, the following wells could contribute to temporary cumulative transportation impacts.

- Leon Lake #4 and #5 – Well abandonment and reclamation at Leon Lake #1 and recompletion drilling at Leon Lake #2 gas wells and Spaulding Peak #1 wells, other construction activities on nearby private and public lands, recreation and hunting, livestock management, water supply maintenance and local use associated with nearby agricultural, residential, and commercial development could result in temporary traffic impacts on Delta CRs U.50 and 2500 DR and FR 125. The impacts may include slight delays at intersections, reduced speeds on CRs, and temporary increases in accident risks. The cumulative effects of this traffic may accelerate the need for road maintenance. The timing of the impacts could be affected by the timing/sequencing of the Spaulding Peak #1 well on private land. If an extended integrated development schedule is implemented, some project-related traffic that would otherwise occur during the summer recess for local schools, could occur when school is in session. This situation might be avoided if the development occurs over several seasons.

- Bull Park and Powerline – Travel on Stevens Gulch Road (Delta CR 40.10 and FR 701) could experience temporary, short-duration transportation effects, such as minor delays at intersections, following behind slower moving traffic, or having to slow to pass vehicles moving in the opposite direction on roads that are narrower than the major state and local roads in the region. These effects would result when coincidental use occurs between project-related traffic and that related to timber harvest and hauling from the Hubbard timber sale, activities associated with the WAPA powerline and access road, clearing associated with the Rifle-Curecanti powerline project, livestock management, firewood collection, recreation and hunting use, coal exploration, local use by residents, and drilling and completion activities associated with the Stevens Gulch #1 well on private land. Project-related traffic combined with traffic from cumulative actions could contribute to wear on unpaved roads such as FR 701.

  Potential cumulative impacts could also arise in connection with the Cow timber sale scheduled to occur in 2004. Although the timing and duration of the timber harvest associated with that sale is not known, a potential period of overlap between that activity and the drilling and completion of the Bull Park and Powerline wells does exist. With respect to heavy truck traffic, the Proposed Action represents approximately 170 heavy-truck trips on the Stevens Gulch road. That volume compares to 700 to 770 heavy-truck trips with the remaining harvest from the Hubbard timber sale, anticipated to occur in 2003, and 600 to 665 heavy-truck trips with the Cow sale, in 2004 or subsequent years.[1] Both sales would generate additional heavy- and light-duty traffic associated with equipment hauling and employee commuting.

  Delays in drilling and completion activity arising from the interactions of the Proposed Action and the private well program could result in some overlap between project-related traffic and hunters traveling in the area at the beginning of the big game hunting season. Such conflicts already occur in conjunction with the timber harvest and hauling associated with the Hubbard timber sales. The extent to which the

[1] These traffic volumes are based on net harvest estimates of 1.75 million board-feet for the Hubbard sale and 1.50 million board-feet for the Cow sale and a range of 4,500 to 5,000 board-feet per truckload.

Proposed Action contributes to such impacts would be predicated on the timing of activity, the duration of the overlap, and level of traffic associated with the other reasonably foreseeable developments.

- Hubbard Creek and Oakbrush – Potential cumulative transportation impacts associated with these wells would be limited in scope due to the low traffic volumes associated with other existing and reasonably foreseeable developments (e.g., Oxbow Mining and other coal exploration, outfitter guides, private use, Lone Pine #1 gas exploration, livestock grazing, and Stevens Gulch timber harvest). The low traffic volumes result in a lower incidence of events such as vehicles passing in opposite directions on narrow roads, or having traveling speeds impeded by slower moving traffic. Potential cumulative impacts in the form of conflicts between project-related and hunting use, similar to those described for the Bull Park well above, also arise for these two wells. The potential degree of impact would be lower because the Bear Creek road does not connect to other roads and thus does not serve as a major access road into the southern portions of the GMUG. However, the interactions of the proposed wells and the Lone Pine #1 well on private land would result in a longer combined duration of project- and non-project-related well drilling and completion traffic.

- Hawksnest and Thompson Creek – The Coal Gulch road was originally developed in conjunction with historical coal exploration and mining activity. Currently, it primarily serves recreational, hunting, and other forest users, many of whom engage in ATV use. Consequently, potential cumulative impacts for these wells consist primarily of conflicts between different users during the period of well activity, the potential overlap with hunting in the area, and the possibility that the improved access will increase the amount of recreation use in the area.

3.12.4 Potential Mitigation Measures

The following additional protection measures would be implemented to reduce the remaining impacts for transportation:

T-1: Pre-construction coordination with property owners, tenants, water-utility companies, grazing permit-holders, and others along local roads to ensure maintenance of access during any construction activities.

T-2: Completion of a pre-construction road condition assessment for affected local county, USFS, and BLM roads. This assessment should be a cooperative undertaking between the project applicant, affected counties, and the federal agencies.

T-3: Develop an agreement between affected counties and the project applicant outlining the identification of and responsibilities for maintenance of access road repair of unexpected road damage from the Proposed Action. This may include installation of additional surfacing and surface drainage/erosion control structures not foreseen during construction.

T-4: Prohibit project-related heavy truck travel, including water-hauling, from SH 65 over the Grand Mesa.

T-5: Traffic counters, to be provided and installed by the project applicant, may be required on one or more of the well access roads to record the level of project-related traffic. If required, the counters would be

monitored and the data transmitted to the District Ranger for a period of time and frequency determined by the USFS.

T-6: Any unexpected project-related damage to FR 701 must be repaired as soon as possible to avoid adverse impacts on the timber harvesting and hauling operations in the Gunnison National Forest.

T-7: Survey the USFS boundary at the Thompson Creek well site to ensure no encroachment into IRA.

T-8: Streams would be crossed at right angles, and on as gentle a grade and slope as possible. Install all crossings in a manner to maintain stable channel conditions and favorable water quality and aquatic habitat.

T-9: Cattle guards, of sufficient strength to handle the proposed project traffic, would be installed and maintained as required for the duration of the project.

T-10: To prevent road damage, activities may be curtailed during periods when the soil and/or road subgrade is saturated.

T-11: The operator would abide by seasonal road closures.

T-12: All new roads would be signed and equipped with a lockable gate to prevent general public use of the road. Unauthorized use or failure to keep gates locked would be considered a violation of terms of the APD or associated grants.

T-13: The application of water would be the only authorized method of dust control on the new roads.

3.13 Socioeconomics

3.13.1 Affected Environment

The study area for assessing the potential socioeconomic impacts of the proposed exploratory drilling program and the cumulative effects area includes Delta County and the northwest portion of Gunnison County, including the community of Somerset and the nearby area. The determination of the region of influence is based on the geographic locations of the proposed wells; the highway access routes to those sites; and the affected governmental entities and service providers encompassing those locations, routes, and communities in the area. Socioeconomic conditions characterized in this assessment include economic and population conditions, community structure, and selected local government services and fiscal conditions.

3.13.1.1 Economic Conditions

The regional economy traditionally has been natural resource-based, with coal mining and agriculture the economic mainstays. In recent years, gains in manufacturing, services, and trade, along with construction related to mining and new homes, have provided a measure of economic diversification.

The region's coal mining industry has experienced several cycles of expansion and contraction in response to changing market demands driven by technological and environmental influences. The current resurgence of mining in the region dates to the early 1990s. Three large coal mines, having a combined annual output of 14 to 15 million tons of high-British thermal unit (Btu), low-sulfur coal, and employing approximately 900 workers, currently are active in the region: the Bowie Resource Limited Mine east of Paonia in Delta County and Oxbow's Sanborn Creek and Arch Coal's West Elk mines near Somerset in Gunnison County (Bear 2003; Schmidt 2003; and Robinson 2003).

In 1997, there were 1,041 farms and ranches, with nearly 281,900 acres of the land area in Delta County (approximately 38 percent of the total) in agricultural use. Little of the Gunnison County portion of the region is in agriculture use. Livestock (primarily cattle), alfalfa used for winter feed, and fruit (primarily apples and peaches) are the region's principal agricultural products. Historically, livestock sales have accounted for approximately 60 percent of the gross farm revenue compared to 40 percent from commodities. Local ranches benefit from livestock grazing permits on federally managed public lands in the area. Over time, the number of farms and ranches in Delta County has increased, but the average size has decreased, as larger operations have been subdivided into smaller operating units or for residential development (USDA 1999). As part of that trend, the combined acreage of orchards has declined by 63 percent since 1978. In recent years, local plantings of wine grapes and the emergence of a winemaking industry have offset some of that decline. Delta County ranks second in the state, after Mesa County, in terms of the total number of wine grapevines planted (Colorado Department of Agriculture and USDA 2002).

In 2000, employment in Delta County totaled 13,275 jobs, including full- and part-time positions and proprietors. That total was 4,503 jobs, or more than 51 percent higher than the 1990 total employment of 8,772. The private sector added 4,000 jobs, while state and local government agencies in Delta County added 478 additional jobs. Federal government and farm employment were effectively unchanged over the

decade. Employment in Gunnison Country climbed from 7,024 jobs in 1990 to 11,244 in 2000, including 487 additional mining jobs. With the exception of the mining jobs, the employment gains in Gunnison County were located outside the region of influence (U.S. Bureau of Economic Analysis 2002).

Unemployment in the region has fluctuated between 3.8 percent and 6.6 percent between 1996 and 2002. During that period, unemployment rates in Gunnison County generally have been slightly higher than in Delta County, and the rates in both counties have tended to be above the statewide averages during the corresponding periods (Colorado Department of Employment and Training 2003).

Both local employment and unemployment in Delta County exhibit moderate seasonal fluctuations associated with recreation, hunting, tourism, and travel through the region. For instance, peak total employment in the retail trade and accommodations and food service industries in August 2002 was 8.1 percent higher than the annual average. At the same time, summertime unemployment fell to 3.3 percent, compared to the annual average of 4.1 percent (Colorado Department of Employment and Training 2003). Labor market information is not available for sub-county areas. Employment and unemployment patterns in the affected portion of Gunnison County are believed to exhibit similar seasonal fluctuation, although hiring and employment levels at the mines are the over-riding economic influence.

The business and public sector work sites are geographically concentrated in and near the larger communities in the region. In 2000, the U.S. Census Bureau tallied 757 separate employers or business establishments in the region. Of that total, 51 percent were in or near the City of Delta. Another 15 percent of the establishments were in Paonia and the nearby environs, with a comparable number in the Cedaredge/Eckert/Orchard City corridor. Hotchkiss was home to approximately 11 percent of the establishments, with the remaining 8 percent located in Crawford, Somerset, and smaller communities (U.S. Census Bureau 2002). Most employers in the region are small; more than 620 of all local establishments had fewer than 10 employees.

Total personal income in Delta County increased from $271.3 million in 1990, to $546.6 million in 2000. In 2000, more than $35.5 million of the total income were wages and salaries earned by residents at jobs located outside of Delta County, including the coal mines in Gunnison County. However, employment-related earnings represented just over 51 percent of the total personal income. Income received in the form of dividends, interest, rental income, retirement benefits, welfare assistance, and other forms of transfer payment totaled $266.0 million, or 49 percent of the total, in that same year. The large share of income derived from non-earnings sources reflects the relatively large number of retired and semi-retired households in Delta County. Information reported in the results of the 2000 decennial census and by the U.S. Internal Revenue Service indicates an influx of many such households in recent years.

Per capita personal income in Delta County consistently has been below the statewide averages and that of nearby counties. In 2000, the per capita personal income in Delta County was $19,530 compared to $20,854 in Gunnison County and the statewide average of $36,989 per capita.

3.13.1.2 Population and Demographics

The number of permanent residents living in the region correlates strongly with its economic climate. Population increases during periods of economic expansion and declines during periods of economic weakness and contraction. The correlation is evident in **Figure 3.13-1,** which displays population and employment in Delta County between 1970 and 2000. As shown, the beginning of the current period of growth coincides with a resurgence of coal mining in the region. Increased immigration of households not specifically linked to local employment opportunities, (i.e., non-economic migration) also contributed to growth during the past decade.

The population of Delta County climbed by 6,854 residents between 1990 and 2000, a 33 percent net increase. The growth was relatively consistent over the decade and averaged 2.9 percent annually. Statewide population growth averaged approximately 2.7 percent annually during the same period.

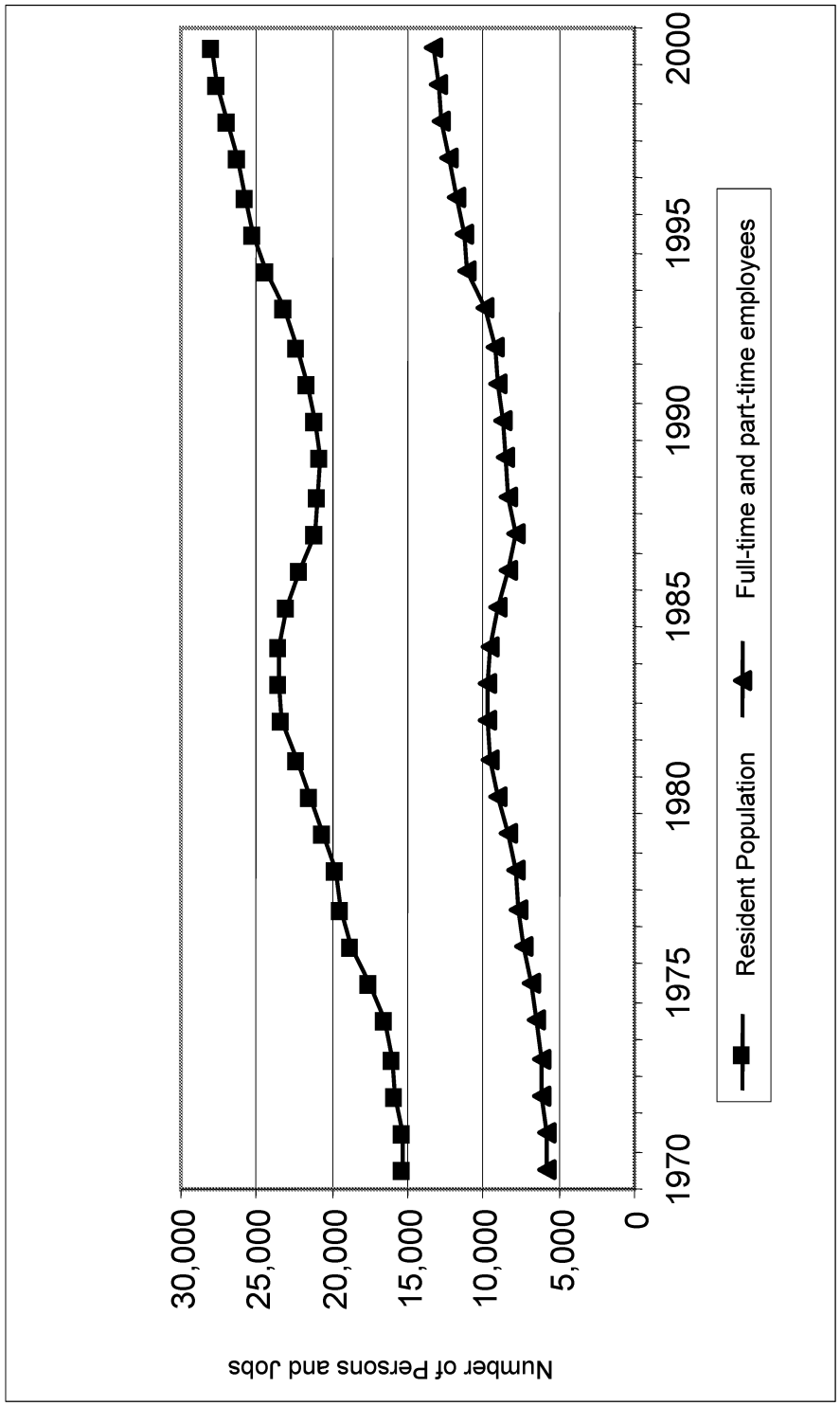
There are six municipalities in Delta County: Cedaredge, Crawford, Delta, Hotchkiss, Orchard City, and Paonia. The City of Delta is the largest and the county seat. All six communities experienced population growth during the 1990s (see **Table 3.13-1**), lead by a 2,611 person, or 69 percent gain, in Delta. Nearly 40 percent of the total growth was in the unincorporated portions of Delta County, particularly in the Surface Creek/SH 65 corridor northeast of Delta and on mesas and hillsides in eastern Delta County.

Table 3.13-1
Population Growth Trends
1990 to 2000

	Population		Population Change	
Community/Area	**1990**	**2000**	**Absolute**	**Percent**
Cedaredge	1,380	1,854	474	34
Crawford	221	366	145	66
Delta	3,789	6,400	2,611	69
Hotchkiss	744	968	224	30
Orchard City	2,218	2,880	662	30
Paonia	1,403	1,497	94	7
Remainder of Delta County	11,225	13,869	2,644	24
Delta County Total	**20,980**	27,834	6,854	33
Somerset County Census Division	390	488	98	25

Source: U.S. Census Bureau 2002.

Migration has played an important role in Delta County's population growth in recent years. At the time of the 2000 decennial census, 28 percent of local residents had moved into the area since 1995. From 1995 to 2001, annual out-migration averaged 1,390 residents per year. Annual immigration averaged approximately 1,760 residents during the same period, yielding a net annual migration of 370 residents per year (U.S. Department of the Treasury 2002).



Source: U.S. Bureau of Economic Analysis 2002.

Figure 3.13-1. Delta County Population and Employment 1970 to 2000

In terms of demographic composition, the population of the region tends to be older, lives in smaller households, and is predominately white. Data from the 2000 census show a median age of 42.3 years and nearly 20 percent aged 65 years and over in Delta County, compared to a median age of 34.3 years and 10 percent aged 65 and over among all Colorado residents. The average household size in Delta County is 2.43 persons compared to 2.53 persons statewide. In terms of racial composition, 92.3 percent of Delta County residents identified themselves as white, compared to 82.8 percent statewide.

The community in closest proximity to the Bear Creek and Coal Gulch roads is the unincorporated town of Somerset in northwestern Gunnison County on SH 133. The town is somewhat economically and socially isolated from the remainder of the county by distance and a lack of all-weather highway connections. Somerset and surrounding unincorporated Gunnison County, formally designated as the Somerset County Census Division (CCD), had a population of 488 year-round residents in 2000, a 25 percent increase compared with the 390 residents in 1990. Over 80 percent of Somerset's residents were 21 years and over and the median age was 43.9 years. Resident households in the Somerset CCD averaged 2.3 persons.

Labor force participation and employment among the resident population are high, although many residents commute to jobs in neighboring Delta County. According to the 2000 census, unemployment among the labor force stood at 4.9 percent. Per capita income in the Somerset CCD was $27,070, nearly 13 percent above the statewide average.

3.13.1.3 Local Government and Public Services

All of the proposed exploratory wells would be located on federal lands in unincorporated areas of Delta and Gunnison counties. As required by Colorado statutes, both Delta and Gunnison counties maintain administration, planning, finance, local ad valorem assessment, clerk and recording, law enforcement and other emergency services, road and bridge, and various other departmental functions. Delta County and Gunnison County each have about 200 employees on staff.

Delta County's revenue budget for fiscal year 2000 was $14.6 million. Major sources of revenue were property taxes (17 percent); sales and use taxes (19 percent); other local fees and taxes (6 percent); charges, fines, interest, and miscellaneous (18 percent); and state and federal intergovernmental revenues (40 percent). The latter category included federal payments in lieu of taxes (PILTs) based on the location of federally-managed lands in Delta County, disbursements of state and federal severance taxes, mineral royalty and lease revenues, and other fees processed through the state and energy impact assistance grants. Congress authorized the PILT program to help support local governments facing demands for additional services (e.g., law enforcement and other emergency services associated with outdoor recreation) due to the presence of the federal lands (Colorado Department of Local Affairs 2002).

Lessees, including the project proponent, are required to pay rental fees for the use of federal land for oil and gas activities. Rental rates have varied over the years, but current rates are $1.50 per acre per year, for the first 5 years, and $2.00 per acre per year thereafter. Payment of fees is required even if there is no activity on the leasehold. Failure to pay the fees invalidates the lease. There are approximately 250,000 acres under lease in the GMUG for oil and gas at present. In addition to the rental fees, royalties of 12.5 percent accrue on the value of oil and gas production from federal leases. One half of the federal

royalties are distributed to the state in which the production occurred. In Colorado, those proceeds are distributed to local governments in the county of origin, the state school fund, the energy and mineral impact assistance program, and the Colorado Water Conservation Board. Local governments and the school district have shared in the distribution of these funds over time.

Local receipts of PILT, severance and other mineral production payments and energy impact assistance grants fluctuate in response to Congressional appropriation levels, statutory allocations, production levels and market value of sales, residency of energy workers, and other factors. In fiscal year 2001, disbursements of such funds to Delta County and other local entities in the county included the following sums: $58,348 from USFS leases and fees, $423,303 from BLM mineral leasing revenue, $432,229 in PILTs based on USFS and BLM acreage, $128,975 in direct distributions of severance taxes, and $531,250 in energy/mineral impact assistance grants. Disbursements to Gunnison County and other local entities in that county included: $304,406 from USFS leases and fees, $555,056 in BLM mineral leasing revenue, $274,887 in PILTs, $4,728 in direct severance tax distributions, and $200,000 in energy impact assistance grants. The local use of such funds, other than the energy impact assistance grants made for specific purposes, is not earmarked. For example, in recent years Delta County has transferred some of its PILT receipts into the general fund, the road and bridge fund, capital improvement fund, and contingency fund (BLM 2003b; Colorado Department of Local Affairs 2002; Colorado Office of the State Auditor 2002; Delta County 2001; USFS 2003b).

Public hospitals, supported by countywide property tax mill levies, operate in both counties. Fire protection and emergency medical/ambulance districts, staffed primarily by volunteers, also exist in both counties.

Delta County School District 50J provides primary and secondary public education for the entire region of influence. District 50J serves the portion of Gunnison County under an agreement with Gunnison District RE1J. The arrangement recognizes the economic and other challenges associated with the low population and corresponding student enrollment in the Somerset area and its distance from the remainder of Gunnison County. Under the agreement, the ad valorem tax base and associated property taxes derived from the area, which includes two coal mines, accrues to District 50J, as does any state school equalization funding. District 50J operates 18 schools, including three alternative community schools. Voters in the district approved a bond issue in the 2002 general election. Proceeds for bond sales will be used to address capacity and other capital improvement needs (Delta County School District 50J 2002).

3.13.1.4 Local Attitudes and Lifestyles

A long-standing relationship exists in Delta County between natural-resource exploration and development, economic and community development, social attitudes and opinions, and individual lifestyles. Both coal mining and agriculture are tied to natural resources, and both have been major influences in the region's economic and community development for over a century. Public lands, including federally managed rangelands, forests, elements of the national park system, and state recreation areas, also are linked to natural resources. Consequently, residents hold a wide range of attitudes regarding the management of public lands; the appropriate types and levels of natural resource development and other allowable uses; and the balancing of property rights between surface and sub-surface interests. The use and management of public lands play important roles in the lifestyles of many residents and visitors to the area.

No broad-based public opinion polls or surveys that reliably ascertain local attitudes toward natural resource development, or identify the linkages between public lands, natural resource development and lifestyles were available for this analysis. A review of local media reports and the public scoping for this project indicates that mineral and resource development, including natural gas, has both supporters and opponents among local residents, organizations, and institutions. Local concern regarding potential impacts from natural gas development including, for example, potential impacts on property values, tourism, and business revenues, spurred the formation of the Grand Mesa Citizen's Alliance, an advocacy group promoting heightened environmental standards and regulation of oil and gas development within county boundaries.

3.13.2 Environmental Consequences

3.13.2.1 Proposed Action

Implementation of the Proposed Action would result in short-term increase in expenditures associated with access road improvements and construction, pad development, well drilling and completion, monitoring, and interim and/or final reclamation. The majority of these expenditures would translate into temporary increases in business volume for oil and gas service and supply contractors and establishments based in Mesa and Garfield counties in Colorado and/or Daggett County (Vernal), Utah.

3.13.2.2 Economic Effects

Project-related expenditures would provide short-term job support over the 75- to 80-day period required to drill and complete the eight wells. Project-related jobs would include both onsite employment directly involved with the drilling and completion activities and workers associated with transportation and specialized well service firms that are onsite for brief periods, often only a few hours, periodically during the course of other activities.

Direct onsite employment would range from 2 to 5 jobs at the outset of access road and well pad construction to a high of approximately 25 jobs when the drilling and completion rigs are both operating. Depending on scheduling and the specific activity involved, as few as 5 and as many as 35 to 40 additional workers could be involved with the program, resulting in a peak of approximately 20 workers onsite at any one well site on any given day.

Spending by non-local project-related workers temporarily would benefit businesses in Somerset, Paonia, Hotchkiss, Cedaredge, and Delta as the activity nodes shift from site to site. However, it would represent a small increment of the overall local economies due to the anticipated low numbers of project-related workers and the short-term temporary nature of the project.

Local concerns have been raised regarding potential adverse impacts from the Proposed Action on property values, farm income, tourism, recreation, and hunting, and hence, on the same types of businesses that would benefit from worker-related spending. The potential for such impacts occurring to any discernible degree is negligible for the Proposed Action. This conclusion is based on the temporary and short-term duration of the project, the distances separating the eight well sites from major highways, developed

recreation or tourism destinations, and residential development; the limited absence of ancillary production and transmission facilities; negligible impact on grazing capacity, and the low volumes and geographic and time-of-day dispersion of project-related traffic. No displacement of big game herds is anticipated. Rather, wildlife will simply avoid the well sites during periods of activity, almost all of which would occur prior to the big game hunting seasons. Consequently, no discernible impact to the level of hunting or to hunting related business revenues are expected. Road improvements and other measures to preserve established public access would allow on-going timber harvest, firewood removal, recreation, and hunting activities to continue with little or no interruption or change.

The economic impacts associated with the Proposed Action would be short-term in nature. No long-term impacts, either beneficial or adverse, would be foreseen following the conclusion of monitoring and reclamation.

3.13.2.3 Population Effects

No discernible population impacts would be anticipated from the Proposed Action. The short duration of the project, combined with the limited number of direct and indirect jobs involved and the anticipated use of few drilling contractors based outside of Delta County, would not provide sufficient inducement for workers to relocate to the area. Based on the low number of non-local workers anticipated for the project, the demand for temporary housing would not be expected to affect tourism capacity adversely. At the same time, the short-term nature of the project, the limited number of wells involved, and the distances separating the well sites from communities and areas of existing residential subdivision and development would not be expected to affect the underlying population migration trends in the region adversely.

3.13.2.4 Effects on Local Government and Public Services

The Proposed Action would add to current demands on some county administrative functions and service providers. Many county departments would experience no discernible effect from the project as current staffing levels are predicated on meeting the needs of approximately 28,000 permanent residents, over 800 private and public sector establishments, ongoing residential and commercial development and construction activity, and travelers and seasonal residents. In other instances, demands would materialize as the project proceeds. For example, coordination with the county's road and bridge department would be required in conjunction with road use, maintenance, and impact monitoring on county roads. Implementation of the Proposed Action also may result in calls for service to local law enforcement, emergency medical, and fire protection agencies. However, given the Proposed Action's short duration, the limited number of employees and traffic involved, and the geographic and temporal distribution of impacts resulting from the sequencing of activity, the impacts on any given service provider would be limited.

There is a possibility of accidents or other events occurring in conjunction with the Proposed Action that require an emergency response from law enforcement, fire, or emergency medical services. In that regard, the Proposed Action is not substantially different from risks currently associated with existing industrial job sites, seasonal increases in tourists, or visitors traveling through the area on the major highways or other construction activities occurring in the region. Should such an event occur, GEC would face the same responsibilities and liabilities as other parties involved in similar situations.

The Proposed Action would have little net fiscal impact on local governments in the region as only limited changes in general fund revenues and expenditures would result. The exploratory wells would not provide substantial assessed valuation or property tax revenues to local entities, nor adversely affect values of other private property. Federal PILT receipts, which are based primarily on acreage, and mineral royalty payments based on production value, would be unaffected by welling drilling, completion, and testing under the Proposed Action. Lease rental payments would continue as long as the leases remain active. The county and some municipal governments would realize additional sales tax revenues from project-related consumer spending, but also face the prospect of higher road maintenance outlays.

The Proposed Action would have no discernible effects on Delta County School District 50J. Anticipated school enrollments would be unaffected due to the lack of population impacts, and there would be little or no impact on the District's financial resources due to the limited scale, temporary nature and lack of production associated with the exploration program.

3.13.2.5 Local Attitudes and Lifestyles

Approval of the Proposed Action would prompt a range of reactions and perceptions regarding the impacts on individual and community lifestyles that correspond to the individual, organizational and institutional positions, and attitudes regarding natural gas development in Delta County. For some existing and prospective residents and business owners, the Proposed Action may be a factor to consider in lifestyle and investment decisions. However, its influence on those decisions can not be assessed. Supporters of such development and traditional policies with respect to sub-surface rights would be satisfied. At the same time, approval of the Proposed Action would result in dissatisfaction among those residents who oppose natural gas development in the region and view the approval as a precursor to future development. In either case, social tensions in the community associated with the prospect of natural gas development would linger and remain a key dynamic influencing many facets of social and community interaction.

3.13.2.6 Environmental Justice

Based on Executive Order (EO) 12898 published on February 11, 1994, federal agencies must make the achievement of environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations, low-income populations, and Indian tribes. EO 12898 requires identifying whether an area potentially affected by a proposed federal action may include minority or low-income populations and seek input accordingly.

An extensive effort was made to provide all interested parties in the project vicinity with access to public information and opportunities to participate in the review process for the project, as described in Section 4.1. In addition to the general public consultation process, a supplementary consultation was conducted with Native Americans residing in or with cultural ties to the proposed project area (see Section 3.11). Every effort was made in the public consultation process to ensure that access to information was available to all interested parties in a non-discriminatory manner.

The project analyses in this EA have not identified any adverse effects to low-income or minority populations that differ from potential effects to the general population.

3.13.2.7 No Action

Under the No Action Alternative, APD and ROW approvals would not be granted. From a socioeconomic perspective, the implications of No Action are that current conditions and trends affecting economic, population, and local governments and services would continue uninfluenced by the direct and secondary activities associated with the drilling, completion, testing, monitoring and reclamation of the proposed exploratory gas wells. This does not mean, however, that socioeconomic conditions would remain static. Rather, local conditions would respond to other stimuli, such as the startup or closure of businesses, ongoing residential subdivision activity, and, pressures on farmers and ranchers to cope with drought and changing market conditions. Given the history of Delta County, future changes are likely to exhibit periods of expansion and contraction in response to influences that are not well defined or understood in terms of type, timing, or impact. Local government and other public entities also would respond to changing demands, regulations, and fiscal realities.

3.13.3 Cumulative Impacts

The principal past, present, and reasonably foreseeable future actions with the potential for cumulative socioeconomic impacts include gas exploration and development, continued coal mining, timber sales, and road and other construction projects. Approval of the Proposed Action would result in limited project-related socioeconomic impacts. For example, convenience stores, fast food outlets, and restaurants would experience higher sales. Some residents may secure short-term or seasonal employment in conjunction with the Proposed Action, the private wells or other actions; however, no discernible cumulative impacts on housing, labor force, employment, or income would be expected. The impacts that do occur would be temporary, small in magnitude, and geographically dispersed. Consequently, approval of the Proposed Action would result in a minor incremental temporary increase in cumulative socioeconomic effects for the duration of the proposed exploratory drilling project.

3.13.4 Potential Mitigation Measures

Mitigation measures T-2 and T-3, as proposed for transportation (see Section 3.12.4), also would reduce the remaining impacts for socioeconomics. These measures outline the responsibilities for a pre-construction road condition assessment and repairs for unexpected road damage.

3.14 Hazardous Materials and Solid Waste

3.14.1 Affected Environment

The potentially affected environment resulting from the presence of hazardous materials includes air, water, soil, and biological resources. The study area for hazardous materials encompasses the well sites and the access roads. The cumulative effects area includes the major highway segments (SH 92 east of Delta to SH 133 east of Somerset and north on SH 65) and the network of local roads north of the communities of Paonia, Cedaredge, and Somerset.

Hazardous materials, which are defined in various ways under a number of regulatory programs, can represent potential risks to both human health and to the environment when not managed properly. The term hazardous materials includes the following materials that may be utilized or disposed of in conjunction with drilling and completion operations:

- Substances covered under the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200). The types of materials that may be used in drilling and completion activities and that would be subject to these regulations would include almost all of the materials covered by the regulations identified below.

- Hazardous materials as defined under the USDOT regulations in 29 CFR, Parts 170-177.

- Hazardous substances as defined by the CERCLA and listed in 40 CFR Table 302.4.

- Hazardous wastes as defined in the RCRA.

- Hazardous substances and extremely hazardous substances as well as petroleum products such as gasoline, diesel, or propane, that are subject to reporting requirements (Threshold Planning Quantities) under Sections 311 and 312 of the Superfund Amendments and Reauthorization Act (SARA).

- Petroleum products defined as “oil” in the Oil Pollution Act of 1990 - the types of materials used in drilling and completions activities and that would be subject to these requirements include fuels, lubricants, hydraulic oil, and transmission fluids.

In conjunction with the definitions noted above, the following lists provide information regarding management requirements during transportation, storage, and use of particular hazardous chemicals, substances, or materials:

- SARA Title III List of Lists (USEPA 1996) or the Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act.

- USDOT listing of hazardous materials in 49 CFR 172.101.

A list of chemicals and materials that may be used for this project are listed in Appendix D. Some of the products or materials listed in Appendix D contain substances that are found on the EPCRA List of Lists and USDOT list of hazardous materials.

A Hazard Communication Program as defined by the OSHA under 29CFR 1910.1200 will be implemented and copies of the program will be kept in the field office. Also as required by OSHA, GEC will maintain a file containing current MSDSs for all chemicals, compounds, and/or substances that are used during construction, drilling and completion operations in the Project Area.

The USEPA's List of Lists has been reviewed to identify any hazardous substances proposed for use in this project that might fall under the jurisdiction of the statutes cited above. If applicable, SARA Title III (community right to know) information will be submitted yearly as required and copies will be kept in GEC's Denver office, as well as in its field office.

No materials classified as Extremely Hazardous Materials (EHM) under SARA Title II have been identified for use at the proposed sites. If EHM were to be used and stored onsite in excess of Threshold Planning Quantities, reporting under SARA Title III would be required. Any hazardous substance stored onsite or on public land would be identified, with containment planned and approved in advance. Spill plans would address the worst-case scenarios include direct release to water sources. A complete list of all substances would be provided with reportable quantities in the table prior to any activity on public land.

Hazardous materials as defined by USDOT would include fuels and other chemical products. These materials would be transported to work sites in accordance with applicable USDOT rules and regulations. Gasoline and diesel would be required for construction and drilling equipment and vehicles. Fuels would be transported along the roads during the construction and operational phase of the project. During road construction, the estimated amount of fuel to be transported would be small (i.e., several 55-gallon drums for each fuel type). During drilling and completion operations, fuels would be stored in small (500- to 1,000-gallon) tanks at the well sites.

RCRA governs the handling and disposal of solid wastes (USEPA 1998). Solid wastes comprise a broad range of materials that include garbage, refuse, sludge, non-hazardous industrial waste, municipal wastes, and hazardous waste. Solid waste as defined includes solids, liquids, and contained gaseous materials. Hazardous wastes are those materials that exhibit certain characteristics (as defined by laboratory analysis), are generated from specific industrial processes, or chemical compounds, that if abandoned could pose a threat to human health and the environment. Hazardous wastes are not expected to be generated by the proposed project.

The expected waste streams have been identified and methods of handling have been determined. The USEPA has specifically exempted certain waste materials generated in oil and natural gas exploration and production (E&P) from regulation as hazardous wastes (USEPA 1988). To classify as exempt E&P waste, these materials must be intrinsic or uniquely associated with the production of oil and natural gas. Examples of exempt wastes are produced water, drilling fluid, and drill cuttings. Although specifically exempted from regulation as hazardous wastes, these materials are solid wastes and must be disposed in a ways that are

protective of human health and the environment. Disposition of exempt wastes is regulated by the COGCC, the BLM, or the CDPHE depending upon the particular waste and how it is disposed. For the Proposed Action, produced water and spent completion fluids would be trucked to a third-party disposal facility that is properly permitted. Once the produced water is hauled away from the locations it would be transported on access roads to the blacktop roads in the area. **Table 2-6** identifies the haul routes from the proposed well locations to the certified disposal facility.

Other wastes would be classified according to the process that generated the particular waste and would be handled and disposed or recycled in accordance with applicable rules and regulations.

3.14.2 Environmental Consequences

3.14.2.1 Proposed Action

Impacts Applicable to All Sites

Impacts from hazardous materials are largely mainly related to potential spills and leaks of motor fuels and lubricants. Fuel and lubricant spills have the potential to impact soil and water resources, but because of the relatively small amounts of such materials that would be transported and used on the project, impacts from accidental spills are expected to be minimal. In order to minimize potential impacts from fuel and lubricant spills, GEC has evaluated their proposed field operations within the project area and has prepared and would implement a SPCC Plan. In case of a spill of fuels or petroleum products, the plans provide for accidental discharge reporting procedures, spill response, and cleanup measures. Copies would be kept at GEC's field office.

The operator and its contractors would transport, handle, and store hazardous materials/substances in an appropriate manner that prevents them from contaminating soil and water resources or otherwise sensitive environments. Any release (leaks or spills) of hazardous substances in excess of the reportable quantity as established by 40 CFR, Part 117, would be reported as required by the CERCLA of 1980, as amended. If the release of a hazardous substance in a reportable quantity would occur, a copy of a report would be furnished to the BLM's Administrative Order on Consent and all other appropriate federal and state agencies.

Improper handling and disposal of solid waste can impact soil and water resources. GEC would comply with all applicable rules governing the generation and disposal of solid wastes and would employ measures to minimize the amount of wastes generated.

No specific or unique impact information is required for the well sites and their associated roads. Impacts applicable to each well site are discussed above.

3.14.2.2 No Action

No project-related hazardous materials would be transported along local roads under the No Action Alternative.

3.14.3 Cumulative Impacts

Past, present, and reasonably foreseeable activities in the area consist of gas exploration and development, coal mining, and logging. The Proposed Action would have no impact on the hauling and disposal of hazardous materials and solid wastes by these other industries.

If some of the exploratory wells are converted to production wells under separate permitting, over the lifetime of the wells very little hazardous material or substance consumption is expected unless maintenance (workovers) or re-completions are conducted on the wells. Such operations would not be expected to use materials that are substantially different from completion operations (fuels and downhole treatment chemicals). It is possible that new zones may have to be fracture stimulated as in the initial well completion. Workovers and re-completions would be rare short-term occurrences (less than two weeks) and not expected to pose impacts beyond the proposed project.

3.14.4 Potential Mitigation Measures

The presence of hazardous materials in dried residue or water, if present, in the reserve pit would be determined prior to covering, as identified in mitigation S-3 for soils and WR-2 for water resources. Restrictions on fueling near waterbodies also would be implemented, as discussed in mitigation WR-1 for water resources. The following additional mitigation would be implemented for hazardous materials.

HZ-1: Disposal records of all waste streams must be current and well maintained.

HZ-2: Control and containment mitigation would be included in the SPCC Plan, Emergency Response Plan, and Safety Plan in the event of a release of a hazardous substance or material. The plans would be provided to BLM and USFS prior to construction onsite so approval could be completed prior to any disturbance operations.

HZ-3: All releases (unless the reportable spill quantity is less than 10 gallons) of any substance to soil or water would be immediately reported to BLM and USFS Compliance Officers and proof of cleanup provided for the record.

HZ-4: Final written certification is required that any residual materials left in the reserve pits do not contain hazardous constituents at concentrations that would meet the definition of a hazardous waste as defined under RCRA.

3.15 Health and Safety

Health and safety issues associated with the proposed exploration project include potential surface water and groundwater quality effects from a release of produced water during transport to the disposal facility and potential health effects of hydrofracturing chemicals used during drilling, fire hazards, traffic-related safety issues, the potential for and effects of a well blowout, and coordination with local emergency services. These issues are discussed below.

3.15.1 Water-resource-related Issues

As discussed in Sections 2.1.8.3, 3.4.2.1, and 3.12.2, produced water (saline water and spent hydrofracturing chemicals) would be contained onsite in tanks, tested, and transported to a certified disposal facility using a route other than SH 65 (see **Table 2-6**). The quantity of water that would be produced during completion is not known at this time; however, based on drilling data for the area, it likely would range from 0 to 150 bpd per well, declining to 30 bpd after 5 months.

As discussed in Section 2.1.9, four truck trips per well per day may be needed during the post-completion phase. This slight increase in traffic on SH 50 and SH 92 would be less than 1 percent of current traffic levels. Based on the overall minor increase in traffic levels, the correspondingly minor potential for an accident resulting in a release of produced water during transport, and the probability of such a release directly entering a waterway, potential impacts to water quality due to a spill of produced water during transport is considered low.

As discussed in Section 3.4.2.2, groundwater quality would not be affected by the hydrofracturing of the proposed wells, as the Mesaverde Formation, in which the hydrofracturing would occur, is not a regional aquifer and is not transmissive to groundwater. As a result of the formation's low permeability and low transmissivity, the hydrofracturing chemicals would not move beyond the fracture zones.

Potential hydrofracturing impacts to water sources within a 1-mile radius of the proposed well sites were analyzed in Section 3.4.2.2. Based on this analysis, the seeps and springs identified in the vicinity of the Leon Lake #4 well are fed by groundwater sources in unconsolidated alluvium that lies over 3,000 feet above the proposed hydrofracturing zone. The domestic well identified in the vicinity of the Bull Park well site obtains its water from the Wasatch Formation, which also is well above the Cameo Member of the Mesaverde Formation in which the hydrofracturing would occur. In addition, none of the surface waters in the analysis area have a hydraulic connection to groundwater in the Mesaverde Formation (see Section 3.4.2.1). Due to the lack of hydraulic connection with the Mesaverde Formation and the vertical and horizontal spatial relationship between the proposed exploration wells and the domestic and agricultural groundwater sources in the analysis area, no water quality impacts as a result of hydrofracturing have been identified. As a result, no health effects from hydrofracturing chemicals are anticipated.

To further minimize potential impacts to water resource and the associated potential for health and safety effects, GEC has prepared and would implement a SPCC Plan for a hazardous materials spill or leak. The plan includes accidental reporting procedures, spill response measures to minimize and control a potential release, and cleanup measures.

3.15.2 Fire Hazards

Fire hazards associated with the exploration project would be related to the operation of heavy equipment and vehicles, the use of flammable fuels (e.g., diesel), and flaring. As discussed in Section 3.5.2.1, fire hazards typically are low at the elevations in the project area due to the cool, montane environment. However, the current prolonged drought and fuel build-up over the past century have increased the fire potential, primarily during dry periods in the spring and fall.

To minimize the potential for a project-related fire, GEC would: 1) comply with all USFS and BLM fire restrictions, 2) maintain a vegetation-free zone in the immediate well pad area, and 3) implement their Fire Prevention Plan. In addition, newly constructed project roads would improve access to a degree for fire suppression activities. Specific to flaring, a flare pit and flare stack would be used during drilling/initial completion and testing, respectively, to burn in a controlled environment any gas (including methane) that may be circulating to the surface (see Section 2.1.5), thereby minimizing the potential for an uncontrolled explosion and fire. Any gas circulating to the surface would be piped to the flare pit or flare stack, as applicable. The flare pit would be surrounded by a 6- to 8-foot earthen berm to contain any flaring that would take place during drilling and initial completion. The flare stack would be covered, with no exposed flame. As a result, the potential for a flaring-related fire is considered low.

3.15.3 Transportation-related Issues

As discussed in Section 3.12.2, project-related traffic would be distributed spatially and temporally across the affected road network due to the well sequencing plan (see Section 2.1.9 and **Figure 2-10**) and the different access routes to the eight exploration wells (see **Table 2-6**). As a result, project-related traffic would represent an approximately 1 to 5 percent temporary increase in overall traffic levels, depending on the road segment, with a 10 percent increase observed fewer than five times on SH 92 between Delta and SH 65. This traffic increase would result in a related temporary increase in vehicle accident risks during drilling and completion. The timing, magnitude, and duration of project-related traffic during testing, monitoring, and final reclamation are unknown at this time; however, they likely would be considerably below that associated with drilling and completion. As a result, there would be a correspondingly lower temporary increase in vehicle accident risks during these latter project phases than during drilling and completion. To minimize transportation-related issues and associated accident risks, GEC would implement the well sequencing plan to minimize project-related traffic requirements, restrict project-related vehicle traffic to approved locations, and schedule heavy traffic periods during the week to avoid weekend and holiday traffic. Based on the project-related minor increase in traffic levels and the project design features, the temporary increase in vehicle accident risks is anticipated to be low.

3.15.4 Well Blowouts

Well blowouts are the sudden uncontrollable expulsion of drilling fluid, air, gas, oil, or water from a well as a result of encountering zones of abnormally high pressure. Potential hazards associated with a blowout include injuries to workers, loss of equipment, the spreading of fire to surrounding areas, and environmental and air pollution, depending on the type of blowout. Compared to crude-oil blowouts, gas blowouts tend to

be more dangerous to humans and explosive and have less of an effect on the environment. The present technology associated with blowout prevention and effective well control has reduced the incidence of well blowouts. For example, in 1997, 1 (crude-oil) blowout was reported in 2,933 wells drilled (oil and gas) on Alaska's North Slope (BLM 1998).

In the event of a gas blowout, a plume of natural gas vapors and condensates would disperse rapidly from the blowout site. The plume would not be expected to be hazardous for greater than 1 kilometer (0.62 mile) downwind of the well. While a gas blowout could result in a fire of the surrounding area, the gas plume itself likely would not persist for greater than 1 day (BLM 1998). GEC has developed and would implement a Fire Prevention Plan to minimize the effects of a blowout-related fire.

To minimize the potential for and effects of a blowout, GEC would install appropriate blowout prevention equipment and implement pressure control procedures, as outlined in their APDs. Based on the documented blowout rates and GEC's committed measures, the potential for a blowout in association with the proposed project is anticipated to be low. Although there are recreational trails in the vicinity of the exploration wells (e.g., relocated Pilot Knob/Coal Gulch ATV Trail, which is within 100 feet of the Thompson Creek site), the nearest residence is over 1 mile away. Based on the low potential for a blowout to occur, the distance to the nearest residence, and the low potential that recreationists would be in the vicinity during drilling, the potential that a blowout plume would affect the public is minimal.

3.15.5 Emergency Coordination

GEC has developed and would implement both a SPCC Plan and a Fire Prevention Plan in association with the proposed exploration project. These plans outline the procedures that would be followed and the reporting and emergency services contacts that would be made in the event of a hazardous materials release or fire, respectively.

3.15.6 Potential Mitigation Measures

The following mitigation measures would be implemented to further reduce potential health and safety effects:

HS-1: To further facilitate coordination with local emergency services, GEC would provide mapped locations of the proposed well sites and copies of the SPCC Plan, Fire Prevention Plan, Emergency Response Plan, Safety Plan, and MSDS sheets to the respective emergency services personnel, as applicable, in advance of any exploration drilling activities. In addition, the operator would have cell phones or radios onsite, as appropriate, to provide accessibility to emergency services.

HS-2: Prior to initiation of drilling, GEC would develop a contingency plan that would outline the procedures necessary to regain control of a blowout.

HS-3: Local emergency telephone numbers and GPS coordinates would be posted at well pad sites.

HS-4: Water would be provided onsite for fire suppression purposes.

HS-5: A pilot light must be lit at all times during drilling to avoid explosive accumulation of gas.

HS-6: The operator would be required to conform to any fire restrictions in place on USFS and BLM lands during operations.

3.16 Short-term Use of Human Environment Versus Long-term Productivity

Short-term is defined as the life of the proposed project through the completion of testing and initial reclamation (through the year 2006). Long-term is defined as the future beyond the completion of testing and initial reclamation. For those exploratory wells that are considered to be economically viable, final reclamation would not be completed until future development is completed (25 to 30 years in the future). Potential future development is not part of this NEPA analysis. Most of the impacts identified in this EA would be short-term and would cease after initial reclamation.

Long-term productivity refers to the basic capability of the land to produce according to desired future levels (e.g., vegetation, wildlife habitat, rangeland). Long-term is defined as impacts that would continue beyond the approximate 3-year life of the exploratory drilling project. It is anticipated that productivity for soils, vegetation, wildlife habitat, timber, and rangeland would be restored following successful reclamation of disturbed lands.

3.17 Irreversible/Irretrievable Commitment of Resources

Irreversible is a term that describes the loss of future options. It applies primarily to the effects of use of nonrenewable resources such as minerals, cultural resources, or soil productivity. The irreversible commitment of resources would include the consumption of non-renewable energy or materials, such as diesel fuel, gasoline, and natural gas, and any unidentified cultural resources. Fossil fuels used during construction and exploration drilling and testing would result in irreversible commitments. Gas flaring and venting during testing would be an irreversible use of natural gas. Any disturbance to unidentified cultural sites could result in an irreversible commitment. However, research values could be recovered prior to any physical loss.

Irretrievable is a term that applies to the loss of production, harvest, or use of renewable natural resources. The following irretrievable impacts would occur for the Proposed Action:

- Loss of 10 acres of aspen forest from the construction of well pads and new access roads.
- Loss of 30.13 acres of vegetation (aspen, oakbrush, meadow, and mountain shrub) from construction of the well pads and roads. Reclamation would return vegetation to pre-existing conditions through reseeding and natural reestablishment of woody species.
- Alteration of approximately 30.13 acres of wildlife habitat from well pad and new road construction.
- Minor loss of forage in 5 allotments prior to reclamation for rangeland.
- Use of water for drilling and completion operations and potential for produced water during testing.
- Short-term of soil productivity on approximately 30.13 acres from construction of well pads and access roads.